Food Manufacture

Incorporating Canning, Packing, and Preserving

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The Wheat Quota.

FOR SOME considerable time political prophets have been foretelling the coming of a wheat quota system. For once in a way the prophets were right, and on November 26 Sir John Gilmour, Minister of Agriculture, announced in the House of Commons that the Government had decided to apply the principle of a quota to home-grown wheat and to introduce legislation in time to enable a scheme to become effective for next year's crop. The Minister stated that no contribution from the Exchequer by way of subsidy will be involved, so presumably the consumer will have to pay as usual.

It is no part of the policy of this journal to enter into political discussions, but it is definitely within its sphere to examine critically any problem which affects the food manufacturers in this country. Obviously, the farmers are delighted at the suggestion, and, of course, want it extended to other cereals, such as barley and oats, as well as to sugar beet. The farmers seem to be the only people concerned who are pleased with it.

English Wheat.

The home production of wheat is about one-fifth of the total consumption, so that if all the wheat grown were milled for bread it would only be sufficient for a 20 per cent. quota, but of the wheat grown in this country a great proportion is used in the manufacture of biscuits. What is going to be the position of the biscuit trade when the quota is in operation? Obviously, a big increase in the price of an already expensive commodity. Then, again, a further large proportion of English wheat goes for poultry food. It will be a strange and anomalous situation if the poultry farmers are forced to buy imported wheat because the supply of home-grown wheat is absorbed by the miller. Then there is a further difficulty which will face the country miller who now uses a much bigger amount of English wheat than any quota could be. He will be compelled to use imported wheat and pay extra money for transport from the ports of landing—another factor which will increase the cost of food.

Imported Flour.

There is some disappointment that the Government has not seen fit to prohibit or to tax imported flour. The amount of such flour is surprisingly large—between four and five million sacks of 280 lbs. per annum. There is sufficient milling machinery in England to mill this flour and so utilise British labour and capital and also provide more plentiful, and therefore cheaper, bran and middlings for the English farmer.

We understand that representatives of the milling and baking industries are conferring with the Minister on ways and means, and we hope that a more satisfactory solution than a mere quota system will be evolved.

Diabetic Flour.

There seems to be some confusion about what constitutes a diabetic flour, and we have come across so-called diabetic flours which are indistinguishable from ordinary flour, whereas in some cases the protein content has been as high as 70 per cent. It is evident that there should be some definite standard set for this type of flour, which is being sold in increasing quantities at a price substantially higher than ordinary flour.

We notice in the report of the borough analyst of

Stepney for 1930 a reference to this subject. A sample was taken formally, following the analysis of the same flour (*Diabetic Flour*, No. 1) for a private purchaser. It consisted of ordinary wheat flour in which the protein had been increased by about 10 per cent. (on the flour), the normal amount of starch being, in consequence, reduced to that extent. There could be very little difference in effect between taking this flour or a little less of ordinary flour, but think of the difference in price! This flour was sold in 6-lb. bags at 6s. 6d. per bag. This works out at something like £15 6s. per sack against the current price of about 25s. a sack for ordinary flour. Quite a good price for 10 per cent. extra gluten! In the case in question the vendor was cautioned, and he stated that the flour was sold exactly as it was received from the millers and that the millers accepted responsibility for the article. The millers stated that they published a booklet containing a warning that no diabetic patients should select their diet without first consulting a doctor (but this booklet was not given with the flour).

Some good has been done by forcing the millers to place an analysis of the contents in each bag, but to the man-in-the-street a statement of the protein and starch content conveys very little, and if it is prominently labelled diabetic flour many people will take it at its face value. It would be useful if the required protein content of a diabetic flour were fixed by law and also a price set which would bear a definite relationship to the current price of ordinary flour. Diabetic patients suffer enough by virtue of their infirmity without being fleeced by unscrupulous dealers in what they believe to be an essential food.

Heated Milk.

In the June, 1931, issue of FOOD MANUFACTURE the use of the methylene blue reductase test in grading milk was referred to. Some time ago Rothenfusser (*Analyst*, 1930, vol. 55, p. 758) developed a method for detecting heated milk, and in a recent paper (*Z. Unters. Lebensm.*, 1931, vol. 62, p. 210) he discusses various processes for heating milk, with special reference to his method of detecting heated milk.

The biological, bacteriological, and chemical importance of processes which involve heating at about 79° to 85° C. is emphasised, and an oxidation-reduction reaction suitable for routine work is proposed. It depends on the formation of the blue dye indamine by the oxidation of diparadiaminodiphenylamine sulphate. The reagent is mixed with an organic acid which has no water of crystallisation since the action requires slight acidity. The oxygen carrier is magnesium perborate, which is stable and provides the correct degree of buffering in the milk. Since the chromogen is only sparingly soluble in water or organic solvents, the solid reagents are mixed and inserted in the top of a vertical glass tube containing an axial rod or plunger. The bottom of the tube dips into 5 c.c. of milk in a 10 c.c. tube, and the reagent is added at will by manipulating the central rod. Milk which has been heated at 79° to 80° C. retains its colour, but if a lower temperature has been used a blue colour results, while heating at 77° C. or for a brief period—*e.g.*, thirty seconds—at 79° C. results in a slow reaction. The test should not take longer than one minute.

Potted or Paste?

What is the essential difference between potted salmon and salmon paste? Mr. C. H. Manley, the public analyst for Leeds, certified some time ago that a sample of "potted" salmon contained 80 per cent. of salmon and 20 per cent. of a starchy "filler," and the shopkeeper was summoned for selling adulterated potted salmon. The prosecution maintained that the substance known as potted salmon should contain only pure salmon treated with melted butter and a little seasoning. The substance, which was widely sold, should be known as salmon paste. In this particular case the shopkeeper only charged the commercial rate for salmon paste and not the potted salmon price, although it was labelled potted. The reason for the prosecution was that the health authorities considered that there was a very big volume of meat food substances sold in Leeds under the designation of potted salmon or potted meat, whereas in fact they contained a proportion of starchy substance and should be described as salmon or meat paste. In their zeal for protecting the public interests our health authorities occasionally bring some rather silly prosecutions. This particular one was dismissed on payment of costs. It seems unfair that the tradesman should have to pay the costs of such a trivial action.

The Blackening of Potatoes.

It has frequently been observed that potatoes sometimes darken considerably on the surface after cooking. This applies particularly to potato salads. The darkening is quite distinct from that which occurs with raw potatoes, in which case the action is probably enzymic. This property is a matter of some importance to those concerned in the purchase of potatoes, and Tinkler (*Biochem. J.*, 1931, vol. 25, p. 773) has devised a simple test by means of which it is considered possible to tell by examination of a raw potato whether or not a similar potato will blacken after cooking.

It was discovered that all potatoes contain a substance (or substances) in greatly varying amounts which, on treatment with nitrous acid followed by an alkali, gives a bright red colour. The amount of the

red substance produced in this test was found to vary directly with the amount of blackening which takes place on cooking. A transverse section of potato, about 5 mm. thick, is peeled thinly and covered with 7 per cent. sodium nitrite solution in a small porcelain basin. About 2 c.c.s dilute hydrochloric acid are added and the mixture left for five minutes. The liquid is then poured off and the section covered with 16 per cent. caustic soda solution. The red colour develops in about five minutes. The reaction has not been investigated fully, but it may be that the nitrous acid reacts with a primary amino compound and that a diazo body is produced which couples with a phenoxide to produce a red substance, or it may be due to a direct action of nitrous acid on ligno cellulose. It is suggested that the blackening is due to oxidation and not to enzyme action. If a potato gives a positive indication of probable blackening the fibro-vascular layer of the potato, which would darken, should be removed before cooking, then very little blackening will result.

Bleaching in Confectionery.

The whole question of bleaching in confectionery is rather involved, and the only clear point seems to be the total amount of residual bleaching agents in a finished article. Some interesting work on the rate of boiling on the residual sulphur dioxide content of corn syrups and sugar has recently been published by Morgan (*Analyst*, vol. 56, No. 667, p. 638). After describing his experimental work and detailing the results he obtained, Morgan concludes that the position with regard to the use of bleaches in confectionery and allied industries does not appear to be clear, since some manufacturers maintain that a limited amount of the chemicals can be used, providing that the final sulphur dioxide content is not greater than that initially present in the raw materials themselves. On the contrary, other manufacturers have eliminated the use of bleaches and, after a considerable amount of research work, have altered their processes accordingly. Public analysts, while realising that a considerable proportion of the sulphur dioxide goes off during manufacturing operations, as is shown in the paper under discussion, have been unable to detect the addition of bleach excepting in those cases where the sulphur dioxide content is undoubtedly above the maximum initial limit. Morgan goes on to state that "it is desirable that a limit should be set for the amount of sulphur dioxide in confectionery. A limit of 100 parts per million would cover all products under this heading, as is shown from the experimental results dealing with boilings at 240° F. and upwards. Of course, such a limit would not prevent the use of bleaching agents, but it would restrict the amount which could be added during manufacturing operations and so define the position for the public analyst and form another safeguard in the interest of the general public."

Sugar Moisture Absorption.

At the 1930 meeting of the American Chemical Society, Korfhage and Schuette read a paper on the moisture-absorbing tendencies of sucrose, lævulose, maltose, commercial invert sugar, and commercial corn syrup at varying humidities and at a constant temperature of 77° F. Their behaviour was observed both as mixtures of sugars in varying proportions and when hard-boiled.

Results obtained with pure dextrose and sucrose candies did not confirm the prediction that candies of such composition would be relatively non-hygroscopic. A corn syrup and sucrose mixture was found to be superior in this respect. Maltose candies, although inferior in quality, were found to absorb moisture at approximately the same rate as those made from a mixture of corn syrup and sucrose.

It is interesting to note that U.S.P. 1,789,983 describes a method of making a dextrose candy, consisting in mixing a batch of dehydrated dextrose with an edible oil, heating the mixture sufficiently to melt the dextrose, separating the dextrose from the oil, and recovering the dextrose candy. The process also includes making candy from saccharine substances, in general, by mixing with an edible oil, heating the mixture to about 260° F., decanting the oil and recovering the candy in melted condition.

Vegetable Parchment.

A particularly interesting paper on the examination of vegetable parchment for packing dairy products was submitted to the Congress by Paul Arup, chief analyst to the Irish Free State Butter Testing Station. The Department of Agriculture in Dublin has laid down instructions relating to vegetable parchment for packing butter (Dairy Produce Act, 1924). It was considered desirable to make a detailed investigation of the chemical and physical properties of a number of samples of vegetable parchment commonly used for packing butter, to obtain data for laying down more definite standards. The results of these were given and as a result the following conclusions were reached. These additional standards are tentatively suggested: Water, maximum 10 per cent.; ash, 0·45 per cent.; water soluble extract, 1·30 per cent.; bursting strength by Ashcroft tester, minimum 25 lbs. per square inch for parchments of 25 lbs. per ream, and 18 lbs. per square inch for 18 lbs. per ream. The strength immediately after wetting as described to be at least 33 per cent. of the strength of the unwetted sample.

The percentages of reducing material as dextrose

in the water soluble extract have been calculated as a guide to the detection of added sugar.

Certain standards adopted in Germany—*i.e.*, 8 per cent. of extract and 3 per cent. of ash—are considered far too high, being based on additions of sugar and salt respectively. An unduly high content of extract renders the parchment particularly susceptible to attack by mould.

The water-soluble extract from genuine vegetable parchment was examined, and found to consist of decomposition products of lignocellulose.

Carotene and Vitamin A.

It is reported that Olcott and McCann of the University of Iowa have been able to demonstrate the change of carotene, the yellow colouring matter of carrot, into vitamin A by the action of an enzyme contained in the liver. It was found that when carotene is incubated with fresh liver tissue derived from rats lacking vitamin A, the carotene is destroyed and vitamin A is produced. It has been known for some time that vitamin A is closely related to the carotenes, and if the work of Olcott and McCann is confirmed, we may confidently look for the artificial synthesis of the vitamin in the near future.

Synthetic Vitamin D.

On November 30, Sir Frederick Gowland Hopkins, in the course of his presidential address to the Royal Society, hinted that the artificial production of vitamin D is an accomplished fact. Some four years ago, Rosenheim and Webster of the National Institute for Medical Research and, concurrently, Windaus of Göttingen showed that the antirachitic vitamin D is produced on irradiation of ergosterol. Now it appears that Bourdillon and his fellow workers at the National Institute have arrived at the next stage, of isolating the vitamin itself in crystalline form from the mixed products of irradiation. Curiously enough, Professor Windaus, following a different route, has again arrived simultaneously at the same goal.

No time has been lost in commercialising this remarkable example of scientific research, for pure vitamin D, or "calciferol," as it is known, is already on the market in the form of a white crystalline substance melting between 116° and 117° C. At present the selling price is about £6 a gram. One milligramme of calciferol has an antirachitic activity corresponding to 40,000 of the newly accepted international units.

Synthetic Fowl.

Another point of interest brought out in the same address is that Professor R. C. Punnett has produced what may be called a synthetic fowl, endowed with whatever combination of qualities may be required in the type of bird best suited for egg-laying, canning, and so on. Perhaps the Professor will now turn his attention to producing a synthetic pig; if he can do this, he will earn the gratitude of every curer in the land.

Self-Raising Flour.

In a recent paper two American workers, Logue and McKim, gave some interesting data about self-raising flour in America. They concluded that the consumption of self-raising flour in the United States is increasing more rapidly than the consumption of plain flour. As a result of their investigations on the stability of self-raising flour they stated that the rate of premature decomposition of self-raising flour varies directly with the moisture content, and those flours with less than 12·5 per cent. moisture are relatively stable. Self-raising flours containing more than 12·5 per cent. moisture decompose more rapidly, and result in alkaline baked products unless this premature decomposition is compensated for in increased acid leavening agent.

The figures given for the consumption of self-raising flour in America are interesting. Self-raising flour now constitutes approximately 10 per cent. of the country's consumption. According to Le Clerc and Bailey, it amounts to 21·7 per cent. of the flour consumed by the housewife. The production of self-raising flour in the U.S.A. (very little of which is exported) has increased for the past five years at a cumulative rate of 3·29 per cent. annually. Contrasted with this the total flour consumption during the same period has increased at the rate of 1·55 per cent. annually, a value lower than the rate of population increase of 1·65 per cent. In other words, whereas the total *per capita* flour consumption of the United States is declining, the use of self-raising flour is increasing at a rate double that of the population increase of the country. The 1927 Census of Manufacturers gives the baking powder produced in the United States as 155,941,240 lbs. In the same year the leavening ingredients in self-raising flour calculated to a 14 per cent. baking powder would have amounted to 107,500,000 lbs., or 69 per cent. of the quantity manufactured as baking powder alone.

We are unable to obtain any comparative figures for the United Kingdom, but there are many evidences of the increasing popularity of self-raising flours, and there can be no doubt that such flours, if made by reputable firms, offer many advantages of time saving and absolute regularity of quality to the busy modern housewife. We understand that the amount of self-raising flour used in commercial cake bakeries is steadily increasing.

Cereal Chemistry in 1931

By T. H. FAIRBROTHER, M.Sc., F.I.C.

The following article reviews the advances made in the various departments of cereal chemistry during the past year.

CONTINUED PROGRESS in the investigation of cereals and cereal products, in the year under review, can be reported. A year is not a long period for much progress in scientific research in any of its branches, and this is particularly applicable to cereal chemistry, where the raw material to be examined varies so much. The type of wheats used and the flour milled in the United States are not the same as those in the English mills, and, consequently, results obtained in America are not always applicable to English practice. The different qualities of wheat used in America may account for some of the discrepancies which are noticed when certain researches published in America are repeated on English milled flour. Nevertheless, progress is being made, and 1931 has seen the publication of many interesting papers.

New Varieties of Wheat.

In the agricultural section of the science, investigations have been continued on the development of new varieties of wheat which will lead to more suitable milling qualities. These investigations aim at the production of wheats which will give increased yields with high protein contents, and also varieties which will be resistant to rust and other fungoidal pests. A valuable contribution in this direction was published by Hanna (*Canadian Journal of Research*, February, 1931, p. 134) on the nature of rust resistance in wheat. Determinations were made of catalase, diastase, and oxidase activity, rate of respiration, and content of chlorophyll, xanthophyll, and carotin in the leaves of eight wheat varieties. With respect to their reactions to stem rust, these wheats varied from almost complete susceptibility in certain varieties to a high degree of resistance in others. Catalase activity increased as the plants approached maturity, whereas diastatic activity decreased with increasing age. No significant differences were found in the oxidase activity or respiratory rate of the varieties. Little Club and some members of the Vulgare group proved to be relatively rich in chlorophyll and carotinoids. It was suggested that photosynthetic processes may take place more rapidly in the cells of the varieties having a high content of these pigments, and thus furnish conditions suitable to the growth of rust mycelium. This work on the physiology of the host is most interesting and important.

Experimental Test Baking.

Since cereal chemistry became a defined science, the efforts of most investigators in the field have been directed largely to the determination of those physical and chemical properties of flour which together act to produce the factor called "strength." It is not proposed here to enter into a discussion of strength—that has been dealt with by the writer and others at various times in this journal. The object of the tests carried out has been mainly to predict baking quality accurately, and it has become increasingly evident that no single test will give by itself a reliable index of flour strength. Although the consideration of the several contributory factors can give some useful information, at the present stage of knowledge the actual baking test is the most reliable index, but obviously such a test should be absolutely rigid in technique and standardised in every respect. Much work has been directed to the standardisation of this important test. Doubtless, each individual laboratory has its own technique which will give accurate internal comparisons, but, if this technique is different from that of other laboratories, it will be impossible to obtain external comparative results.

During the last year a most important contribution in this direction has been made by Geddes, Goulden, Hadley, and Bergsteinsson, of the University of Manitoba (*Canadian Journal of Research*, 1931, vol. 4, p. 421; vol. 5, p. 449). This work deals with the influence of mechanical moulding, and, from a very exhaustive enquiry, these workers concluded that machine moulding may reduce, but not entirely eliminate, the large differences in mean loaf volume which different operators secure in baking the same flour. With an experienced experimental baker the variability of replicates for different flours was found to increase as the mean volume increased. Their data have been applied to a consideration of reasonable limits for agreement between duplicate bakings necessary to differentiate between flours. This important work, which involved 4,040 individual baking tests, shows quite clearly that manual manipulation of the doughs during moulding is not a factor of such importance as has commonly been supposed. The results based on 492 pairs of loaves obtained by an experienced operator showed a significant, but slight, reduction in variability for machine moulding, the values expressed as coefficients of variability being 2·88 per cent. and 2·57 per cent. for hand and machine moulding respectively. A further paper on the same subject by Geddes and Goulden appeared in the July, 1931, issue of *Cereal Chemistry*.

American Research

It is now eight years since the appointment by the American Association of Cereal Chemists of a committee on the standardisation of laboratory baking. This committee has examined the methods used in several testing laboratories, evolved a fixed procedure of the type proposed by Werner (*Cereal*

Chemistry, vol. 2, p. 310), and, finally, has made a collaborative study of the fixed procedure. This latter disclosed substantial variability in the results obtained by the several technicians who applied the procedure to the same flour samples. The association realised the need for close investigation, and raised funds to create a Research Fellowship to study the variables. The appointment was made in September, 1930, and during the year under review a comprehensive report of the activities of the Research Fellow (P. P. Merritt) has been published (*Cereal Chemistry*, 1931, vol. 8, p. 267). He found that although prolonged machine mixing gave larger loaf volumes than hand mixing, due to "gluten development," it also gave greater variability. He also found a variation according to the type of mixer used. An important conclusion is that it is "apparently not possible to establish time factors that would permit one to specify the mixing time to be used for one type of machine in order to duplicate results using another type of machine for a definite period. A time differential that serves for one flour does not necessarily hold for another." With regard to moulding, Merritt is inclined to favour machine moulding, as it is convenient and time saving, and suggests that it should tend to reduce variability, especially among different operators. The variability of loaf volume in experimental baking has been studied by Treloar and Larmour (*Cereal Chemistry*, 1931, vol. 8, p. 111).

Influence of Diastase.

The question of a supplementary procedure to be employed in the basic baking test in the case of low diastatic flours has been investigated by Markley and Bailey. They point out that, in comparing the baking values of different flours, there are two types of variables: those which are carried in the genetic constitution of the variety of wheat and those which are quantitatively varied in consequence of environment. This latter group again can be subdivided into two classes: the first is the chemical composition in so far as it is subject to environmental control—*e.g.*, protein. The second group includes enzyme activity, and it is definitely proved that diastase must be present in sufficient concentration if a normal product is to be obtained. Ordinary improvers failed to remedy the poor results obtained with certain low diastatic flours; the addition of high diastatic malt, however, brought the loaf volume to normal, but the proteolytic activity of the malt impaired the colour, grain, and texture of the crumb. They found that the substitution of 3 per cent. of flour milled from wheat sprouted three or four days, for a like amount of the flour under test, would compensate for the deficiency in diastase of the latter.

Cake and Biscuit Flours.

The evaluation of cake and biscuit flours has been neglected somewhat in the past, but in July, 1931, the committee appointed in America to investigate the matter issued a comprehensive report on methods of testing cake and biscuit flours. This includes a method of scoring in which 30 points are given for external factors and 70 points for internal factors. It will be noted that no marks are awarded for flavour—a very wise decision. This report deals exhaustively with such points as creaming, incorporation of ingredients into cake batters, relative amounts of sugar and flour, and viscosity. It will be found of value to all those interested in this section of cereal chemistry. With regard to self-raising flour, an interesting paper on the stability of leavening in self-raising flour has been published by Logue and McKim (*Cereal Chemistry*, 1931, p. 25). The possibilities of a toasted wheat germ self-raising flour have been discussed by Hertwig (*Cereal Chemistry*, 1931, p. 229).

Vitamin Content of Cereals.

The question of relative vitamin content of cereals has received a fair amount of attention, and very interesting work in the vitamin B_2 content of cereals, and the supposed connection between human pellagra and deficiency of this vitamin, has been published by Aykroyd (*Biochem. J.*, vol. 24, p. 1479). The main conclusion was that it was difficult to accept vitamin B_2 deficiency as the sole cause of human pellagra. Plimmer, Raymond, and Lowndes (*Biochem. J.*, 1931, p. 691) have continued their researches on the comparative vitamin B_1 values of foodstuffs, this contribution referring to the cereals. It was found that the cereals were not quite so rich in the vitamin as the pulses. Taking dried yeast as 100, the pulses had a value of 13 and the cereals 10.

Analytical Research

Starch.

Two important contributions on the determination of starch have appeared during the year. The first one is by Herd and Kent-Jones (*J.S.C.I.*, 1931, vol. 50, p. 15T). The authors point out that by "starch" different observers mean different things, and starch determined by one procedure includes fractions which are not included by another. They examined some of the best-known methods, and after comparing them they suggested that the modified Rask method might be of the greatest utility. Hydrolytic methods, which may include material obtainable from fibre—*i.e.*, material which would not normally be considered as starch—are open to grave suspicion.

The determination of starch in flour by diastase and acid hydrolysis has also been discussed by Hartmann and Hillig (*J. Assoc. Off. Agr. Chem.*, 1931, p. 112). They found that the peptic digestion of starch-containing materials prior to diastatic conversion of the starch materially increases the yield of starch. The action of the pepsin consists solely of digestion of the proteins, the starch being thereby rendered accessible to diastatic conversion.

Ash.

A modified method for the determination of the ash of bread has been suggested by Bernardini and Gauthier (*Giorn. Chim. Ind. Appl.*, 1931, p. 7). The suggested method is simple and rapid.

Potts (*Cereal Chemistry*, 1931, p. 232) describes

the use of oxygen in the quick determination of ash, and he claims to shorten the time taken by the regular A.A.C.C. method by three hours.

Moisture.

Much work has been done recently on the rapid determination of moisture in wheat and flour. It is very important to have a method which will give reliable results rapidly. An excellent survey of this branch of research has been published by Coleman, of the Bureau of Agricultural Economics, Washington (*Cereal Chemistry*, 1931, p. 315). In this paper five electric moisture testers are described,—viz., the Burton Pitt apparatus, the Heilan D.K., the dielectrometer, the Limbrick, and the Heppenstall moisture meter for grains. The first three instruments are basically of one type—*i.e.*, wired with specially arranged radio circuits in which an alternating current of high frequency is supplied by means of storage batteries and radio tubes. For certain critical values of the inductance and capacity of the electric circuit the strength of the current is modified when foreign materials are inserted into the condenser. These modifications are controlled by the dielectric properties of the substance under test. Water, for example, has a dielectric constant of 80, whereas that of the solid components of cereals is less than 10. The last two machines—the Limbrick and Heppenstall meters—operate on the conductivity principle. The features and limitations of the various instruments are thoroughly discussed, and, while none of them is absolutely satisfactory—particularly in the case of conditioned wheat—progress is being made, and the reviewer has no doubt that in a few years the difficulties will have been surmounted and a thoroughly reliable instrument perfected. An improved type of apparatus for the determination of moisture by distillation has been designed by Middleton and described in the *Quarterly Journal of Pharmacy*, vol. iv., No. 3, 1931, p. 474.

Protein.

As would be expected, much attention has been paid to the protein components of flour. The relation of peptisation of wheat flour protein to loaf volume has been investigated by Harris (*Cereal Chemistry*, 1931, p. 47, and p. 190). This study was an attempt to discover a method which would definitely place a flour, in regard to strength, without necessarily going through the baking process. A careful study of the papers, however, does not convince one that the attempt has been successful, although interesting results were obtained.

A study of the effects of heat on protein has been carried out by Herd (*Cereal Chemistry*, 1931, p. 1). This work was really an investigation of the "improving" effect brought about by the heating of flour, and, from the results obtained, it would appear that the slight heating of the whole of the flour, to give it a maximum baking quality, causes a small but definite change in the imbibitional powers of the proteins, without any startling changes in solubilities or physical properties. If the alternative method of severe heating of a small percentage of the flour is used, very marked changes in imbibitional and physical properties occur in the proteins. It was also found that bacteria, or the acids produced by them, play an important part in the viscosity changes of a flour suspension during incubation. Herd maintains that it is doubtful if the changes involved in flour heating are strictly a denaturation, but suggests a theory of physical alteration involving an increase in the imbibitional power. The amount of moisture in the flour is probably the main factor determining the extent of the protein modification under a given time and temperature. An interesting paper by Larmour on the relation of wheat protein to baking quality in Saskatchewan hard, red, spring wheat crop of 1929 is probably of more interest in the U.S.A. than in this country.

In the field of general analytical methods a further report of the Committee on Methods of Analysis, under the chairmanship of J. J. Flohil, has been published. This includes protein and moisture determinations in wheat, with special reference to conditions covering the preparation of samples for analysis, such as getting a representative sample, grinding, etc. The grinding of a sample to a fine powder entails a serious source of error in moisture-containing substances such as grain. The loss of moisture incident to grinding disturbs the relation between the protein content of the ground sample and that of the unground one. In addition, the various ashing methods are reviewed, and this report confirms the rapidity of the oxygen method, but stresses the extra care in manipulation required.

Enzymes.

More and more attention is being paid to enzyme activity in flour. Among the papers published on the subject mention must be made of that by Herd on the effects of heat on flour enzymes. The enzymes dealt with are diastase, phosphatase, protease, and catalase. The main conclusion is that the heating of flour to obtain maximum baking strength does not influence enzyme activity appreciably, and that the improved behaviour of the dough is not due to any altered properties of the enzymes. Tissue and Bailey have published the results of their investigations of the proteolytic enzymes of malt preparations.

What has been said above will serve to indicate the activities taking place in the field of cereal chemistry. The chemist is busy trying to find out all he can to assist the miller and the baker, but he cannot always have it all his own way, and often he has to marry theoretical desirabilities to practical necessities. His job is really not to insist on any given type of wheat for a grist so as to give the best flour—it does not require a chemist to do that. What he ought to be able to do is to tell the miller the best procedure to be adopted with any sort of wheat available so as to yield the best results and a consistent quality of flour. The continued researches into the properties and behaviour of wheats and flours are slowly but surely placing him in this position.

The world wheat situation during 1931 has been remarkable for the big surplus of wheat and the extremely low prices ruling. The discarding of the

(*Continued on page* 18.)

The Manufacture of Marzipan

By JOHANNES PILTZ

Information concerning the production of marzipan on a factory scale is given in the following article contributed at our request by a German specialist in the subject.

ONE OF the most popular delicacies for the sweet-toothed is marzipan made exclusively from the best raw materials—almond and sugar. This product, in all its varied forms, has an extensive use in the confectionery and baking trades of every country.

In former years marzipan was prepared by the confectioners by simply grinding the almonds and sugar together in an earthenware mortar, but more recently the technical progress made has resulted in marzipan production being for the most part taken over by manufacturers using up-to-date machinery of special construction.

Cleaning and De-husking.

The sweet almonds are, first of all, treated by immersion in a solution of salt with the object of removing objectionable matter. After a brief interval the almonds rise to the surface while the impurities sink in the brine.

After this treatment the almonds are introduced into a pan with boiling water, where they are kept as well immersed as possible and left to simmer for four to five minutes. By this means the skin of the almond is rendered easily detachable from the kernel. The almonds are then at once treated again with cold water so as to facilitate still further the removal of the skin.

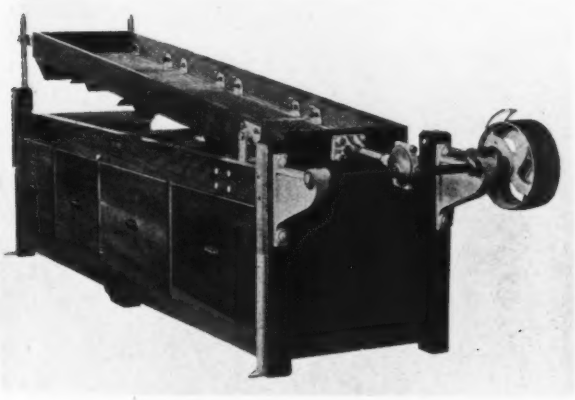
Then the almonds pass first through a de-husking machine, which removes the skins and imparts to the almonds, after repeated spraying with fresh water, an agreeable and white appearance. They are finally hand-sorted to remove any skins which may have escaped the machine.

Milling.

According to the quality, two parts almonds are mixed with one part of sugar. This mixture then passes through a rough kneading machine and thence immediately through finely adjusted granite rollers, from which the crude marzipan mass emerges with a fine and glossy consistency. It should be noted, however, that the utmost cleanliness is required at

Harvesting Almonds in Sicily.

(Reproduced from "Manufacturing Confectioner.")



Almond Sorting and Separating Machine.

(Courtesy of Baker Perkins, Ltd.)

each stage of the production process to ensure the desired quality in the finished article.

Roasting.

The most important and also the most impressive part of the manufacture is the so-called roasting process.

The white and finely rolled almond-sugar mass is now conveyed into a jacketed copper pan capable of rotating at the rate of some 30 to 40 revolutions per minute.

The jacket is connected up with the steam and water pipes, and is at first heated with steam at 3 to 6 atmospheres, so as to cause the mixture of almonds and sugar to reach a temperature in the neighbourhood of boiling-point. Uniformity of heating and a perfectly intimate mixing are ensured by the provision of two wooden arms within the open pan. One of these arms adapts itself precisely to the curvature of the pan and thus serves as a scraper, whereas the arm opposite is adapted to effect a complete and intimate mixing. It is the pan that rotates; the arms remain stationary.

What, then, is exactly effected in this roasting process?

The moisture contained in the wet-ground almond, which, at the commencement of the operation, amounts to approximately 25 per cent. of the entire mixture, causes the sugar, amounting at the same stage to 25 or 30 per cent., to dissolve. The hot sugar solution penetrates and, so to speak, impregnates the mass of ground almonds, just as in the manufacture of jams the sugar penetrates into the texture of the fruit.

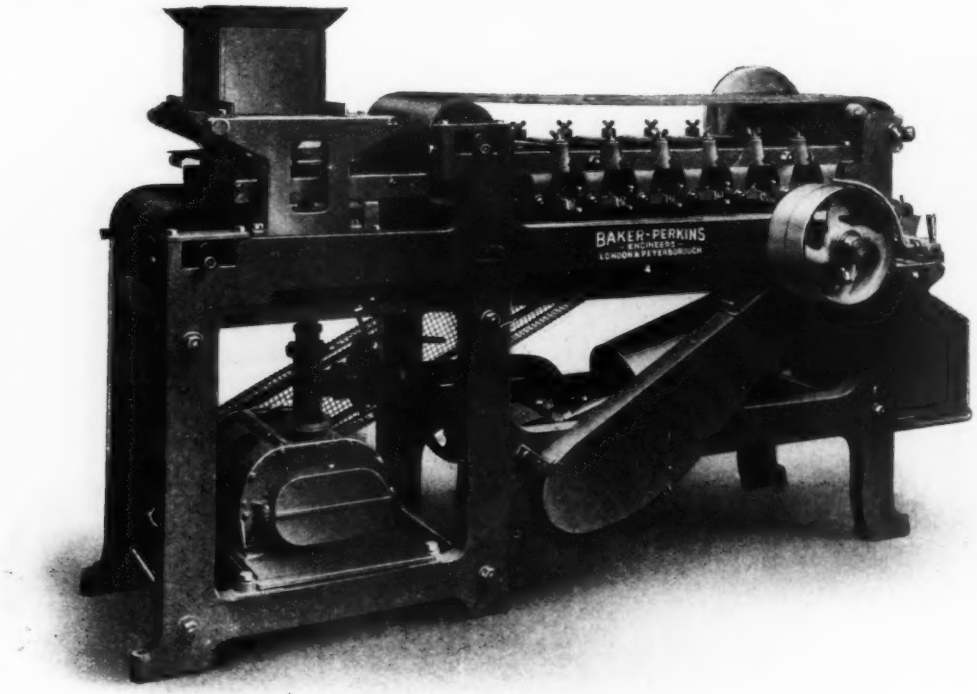
The heating and rotation of the pan are continued for at least twenty-five to thirty minutes, thereby causing a considerable percentage of the moisture to evaporate, so that gradually the relative proportions become adjusted as follows: Moisture, 17 per cent. at the utmost; sugar content, 35 per cent.; and almond dry substance, 48 per cent. The process is regulated in such a manner that these proportions are reached after twenty-five minutes, so that all the fermentation and spoilage bacteria present in the mass will in the meantime have been killed, and the interpenetration of sugar and almond substance will have been completed.

The relative proportions of moisture and sugar are then, as stated, 17 : 35, or, roughly, 1 : 2, so that the sugar is not capable of crystallising out; the dissolved sugar can only crystallise out when the water content in the solution is less than one-third. There is the further circumstance that, during the roasting process, part of the sugar becomes converted into invert sugar, which helps to inhibit the tendency to crystallise out. The question of determining the point at which the crude mass of marzipan is thoroughly and satisfactorily roasted is one for the foreman to test from its appearance and consistency. No precise instructions can be given. The principal test, no doubt, is that employed by the foreman or operative, who observes whether the product sticks or not when applied to the back of his hand. But the best test undoubtedly is that applied by the sensitive hand of the expert, and this can only be acquired after years of experience. The roasting process is the most difficult of all the operations, and necessitates the liveliest and most highly trained supervision. Should too much water evaporate, the marzipan mass will become hard and oily and will very readily become candied—that is, sugar crystals will separate out, as will soon be observed from the sand-like effect on the tongue.

It must be kept in mind that a normal crude marzipan mass contains roughly 30 per cent. of natural almond oil, which is only too prone to separate out from the albuminous matter (with which it forms an

Hand-Picking Shelled Almonds in Sicily.

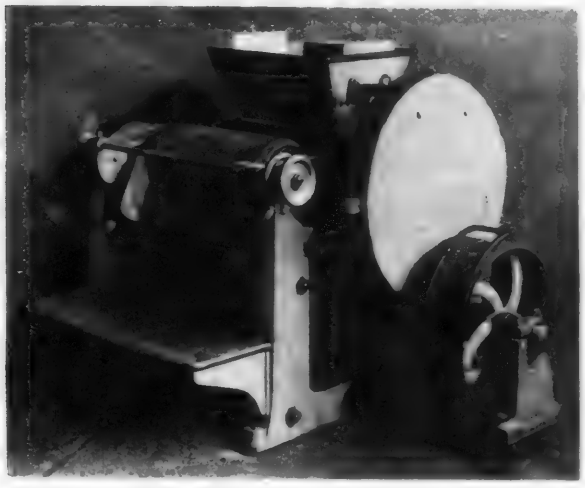
(Reproduced from "Manufacturing Confectioner.")



Two Types of Almond Blanching or De-husking Machines.

Above: The "Baker-Macfarlane" machine. The almonds are fed from the hopper on to an endless travelling band. A second band passes over the first at a slower speed, the surfaces of the two bands being kept in contact with the almonds by a series of resilient rolls, thereby loosening the husks (skins). The kernels and husks then fall into an inclined drum, and the husks are blown up into a collecting chamber.

Below: In the Brierley, Collier, and Hartley machine the husks are removed by means of two rubber rollers, one of which is corrugated and adjustable. The blanched kernels fall into a tray below, while the husks are blown into the wire cage.



Almond Grinding Mill.

(Courtesy of Baker Perkins, Ltd.)

emulsion) as an undesirable fat. It is, however, equally necessary to take precautions that too much moisture is not retained in the mass, as otherwise the marzipan will be too fluid and sticky and, later, will readily undergo fermentation.

In any case, many of the so-called defects in marzipan, which the writer intends to discuss later, arise from defective cleanliness in the roasting operation.

Cooling.

Once the proper degree of roasting has been attained the product must be cooled as quickly as possible. To do this the steam tap is shut off and the water tap opened and cold water circulated through the jacket. In addition, cold air is allowed to play on the mass from a blower above, and it is advisable that the roasted marzipan mass should be spread out on a table having a tinplate top, which will appreciably shorten the cooling process, so that under the combined cooling with air and water the temperature, which was 200 to 212° F., drops in a few minutes to 60 to 65° F. The marzipan mass when properly cooled is still fairly plastic and can be forced into boxes with a spatule.

Filling.

The well-known marzipan boxes, holding generally 28 lbs., consist of resin-free pinewood that is odourless and well dried. The edges of the boxes should be faced with zinc, so as to enable them to withstand the very considerable pressure applied in filling. The boxes are lined with salicyl-parchment paper, and are weighed before being filled, so that the net weight required by the trade can be exactly controlled for each individual box.

The filling operation is another highly important factor in determining the quality of the goods. The problem here is to eject the mass so energetically and accurately from the roasting pan into the boxes that no air cavities are produced anywhere and all corners are completely filled up. Only this will serve to ensure that the mass, which rapidly solidifies in the boxes, will form a compact rectangular block with smooth surface, for rough surfaces tend to promote drying and crust-formation and so render the marzipan mass of no value from the confectioners' and bakers' standpoint.

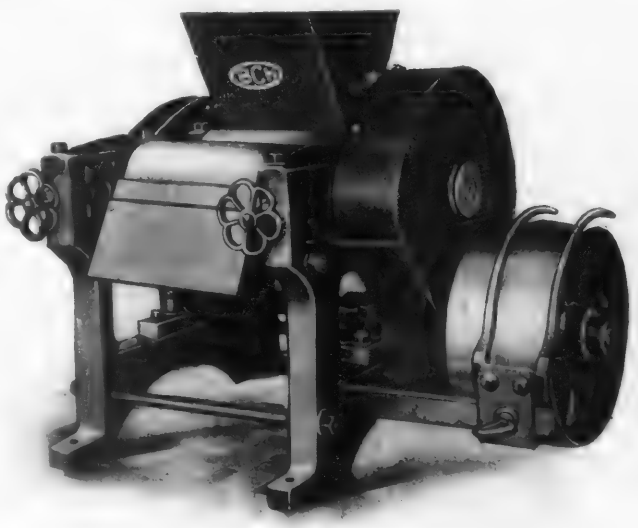
For similar reasons the so-called "mirror" of the surface of the marzipan is of supreme importance. A perfectly smooth and entirely flawless "mirror" forms the best protection from the external effects of moisture and dryness, as well as from mould, fungi, and other micro-organisms carried by the atmosphere. Manufacturing firms of good standing, whose names constitute a guarantee of exceptional quality, are in the habit of embossing their names or trade-marks on the "mirror" with a wooden die, so as to relieve their customers of any suspicion that their goods have been mixed with other qualities.

The packed marzipan boxes are then usually allowed to stand open for several hours in some chamber or space specially prepared for the purpose, so as to permit the mass to settle down and so that each individual box may, before being sent off, be again tested as to its fitness for transport and more particularly its resistance and consistency, thus enabling various qualities to be sorted out so as to meet the wishes of various customers.

Applications.

In its further applications the crude marzipan mass finds an abundant outlet with the confectioner and the baker who produce the most widely varying articles from it by mixing with pulverised sugar, such

(Continued on page 26.)



Triple Roller Almond Mill, Fitted with Three Granite Rollers.

(Courtesy of Wm. Brierley, Collier, and Hartley, Ltd.)

The Manufacture of Diabetic and Milk Chocolates

By DR. ALFRED LAESSIG

In the first part of this article the author proposes the use of certain proteins or protein preparations to replace sugar in chocolate intended for diabetics.

In the second part of the article the author, who has had a lifelong experience of chocolate manufacture in all its branches, discusses certain modifications which he suggests should be made in the customary practice adopted for the manufacture of milk chocolate.

I.—Diabetic Chocolate

SPECIAL PRODUCTS and preparations for the diet of diabetics have received the attention of the chocolate industry for more than a generation past. The assimilation of cane sugar, starch, dextrine, and carbohydrates in general, must be strictly avoided by sufferers from this disease. Sugar, by its very nature, is forbidden, while starch and other carbohydrates are partially split up into sugars by the pepsin contained in stomach juices.

The taste of sugar can certainly be imitated with ease in diabetic chocolate by the addition of small quantities of saccharine (ortho-benzoic sulfimide), an addition of 5 to 10 grms to 1 kgm. of cacao mass being sufficient. But it must be noted that if instead of normal eating chocolate of the following composition:

Cacao mass	42 per cent.	Fat content = 31 per cent.
Cacao butter	8 ,,	
Cane sugar	50 ,,	

an addition of 5 to 10 gms. saccharine to 100 gms. cacao mass was made and the sugar omitted, the resulting product would be in the nature of an extremely sweet cacao mass with a fat content of about 54 per cent. Such an excessive fat content, however, is neither palatable nor advisable on medical grounds, and it is well known that the fat content of palatable eating chocolate should not be allowed to exceed 32 per cent.

Over and above this one has to take into consideration the fact that the normal starch content of cacao mass is fairly high, for which reason diabetic persons run the risk of absorbing a fair amount of starch from the unmixed cacao mass. A simple method of obtaining a paste containing a maximum of 32 per cent. fatty matter free from cane sugar consists in incorporating 40 per cent. cacao mass (54 per cent. fat content) with 60 per cent. cocoa powder (18 per cent. fat content) to give a mass containing about 32 per cent. of fat. To the latter could be added ½ to 1 per cent. of powdered saccharine. The drawback to such a product would be, apart from the relatively high starch content, a too-pronounced taste of cacao.

What has to be aimed at in the manufacture of diabetic chocolate is a mass containing not more than 60 per cent. of cacao, while the 40 per cent. of cane sugar which would normally make up the total weight must be replaced by a substance of indifferent taste (or one whose taste does not disturb that of the final product) which should, above all, not exert a harmful action on the digestive organs of the patient and, if possible, should possess nourishing qualities.

A diabetic *lævulose chocolate* has been manufactured by the firm of Gebr. Stollwerck according to the following recipe:

Cacao mass	40 per cent.
Cacao butter	10 ,,
Lævulose	50 ,,

Now although lævulose or fructose is decidedly better tolerated by diabetics than is saccharose (cane sugar), it is, nevertheless, a carbohydrate, and therefore under suspicion for the ailment under consideration. Another disadvantage is its relatively high price.

It would therefore be more to the point to utilise as a substitute for cane sugar a substance which, from the therapeutical standpoint, is exceptionally well tolerated; in this respect *proteins* or *protein preparations* are especially to be recommended.

Best known among such preparations* are:

Peptone	*Somatose*
Hæmoglobin	*Tropon*
Plasmon	*Eukasin*
Mutase	

Both therapeutically and from the point of view of flavour, *peptone* and *eukasin* can be singled out as the most suitable because of their comparative lack of taste.

The following recipe is for a peptone diabetic chocolate:

Cacao mass	60 kgms.
Peptone	40 ,,
Saccharine	500-1,000 gms.

A suitable eukasin diabetic chocolate would have the following composition:

Cacao mass	60 kgms.
Eukasin	40 ,,
Saccharine	500-1,000 gms.

* *Plasmon* is a milk casein rendered soluble by treatment with alkali. *Mutase* contains 58 per cent. albumin and 2 per cent. phosphoric acid, and is obtained from legumes; it is a yellowish, odourless powder. *Somatose* is an albuminous preparation made from meat, and contains over 90 per cent. soluble meat proteins; it is a yellow, almost odourless and tasteless powder, readily soluble in water. *Tropon* is a preparation containing 90 per cent. albumin, a third of which is of animal origin and the rest of vegetable origin; it is a light brown, granular, and insoluble powder. *Eukasin* is a casein-ammonia preparation.—EDITOR.

According to the degree of fineness required, such a paste should be put two or three times through the rollers, *but it should not be conched*, because such treatment, apart from over-heating, is capable of altering the chemical composition of, or destroying, peptone and eukasin.

It cannot be doubted that such diabetic chocolates as are exemplified in the above two recipes, and which, moreover, are of an entirely novel character, fulfil the required conditions. It is the author's opinion, however, that special value attaches to the eukasin preparation, first on account of its almost complete lack of taste (at the utmost causing a "milky" after-taste), and also because it is much more easily soluble in water than peptone and, furthermore, can be digested with quite exceptional ease. This latter advantage makes it particularly acceptable for diabetics.

11.—Milk Chocolate

When consideration is given to the well-known fact that only a few brands of milk chocolate of worldwide renown are conspicuous for their excellent flavour, the reason must be sought in the spoiling of the milk constituents as a result of unsuitable processes.

On subjecting the mixed constituents of a milk chocolate to the heat-treatment and prolonged conching, which is essential to bring out the distinguishing flavour of a good-quality chocolate, the process is accompanied by the drawback of the injurious effect on the milk constituents. Not only are the milk vitamins and proteins attacked but the quality of the flavour is so depreciated as to give the impression of a chocolate free from milk.

Many firms, therefore, adopted an entirely different process to that successfully used in the manufacture of plain chocolate, the conching being either abandoned in its entirety or carried out at a lukewarm temperature. This is an obviously pointless proceeding, since it discards all the advantages of thorough emulsification and sugar-caramelisation which result in a unique refinement of flavour.

In the working-out of a technique whereby the milk ingredients would not suffer from overheating or other maltreatment, and at the same time would enable the cacao constituents and the sugar to undergo the necessary refining treatment, a treatment leading also to an emulsion of the two latter ingredients, the vitally important point consisted in the avoidance of the above-mentioned errors. To achieve this objective and, at the same time, obtain a satisfactory incorporation of the milk, the necessity of subjecting the chocolate mass and the milk to two entirely distinct processes before finally blending was realised.

The development of this idea involved no difficulties in respect of the treatment of the basic chocolate mass, the rational procedure for the production of good quality plain chocolate being very well known; but it was quite a different matter with the milk constituents, for a material was here called for possessing, it is true, a very high milk content, but also a certain minimum amount of fat to convert it into a mouldable paste, and also enough sugar to bring it into the category of a chocolate attractive to the palate.

It was found that this end could be attained by preparing a milk paste consisting of:

Full milk powder	50 kgms.
Cacao butter	20 ,,
Fine sugar	30 ,,

and a cream paste made up of:

Cream powder	60 kgms.
Cacao butter	10 ,,
Fine sugar	30 ,,

The milk paste accordingly contains 32 per cent., and the cream paste 34 per cent. of total fats, both containing, in addition, 30 per cent. of sugar. The equality in fat and sugar content here obtained thus fulfils the first requirement of any chocolate mass with a well-rounded flavour.

In preparing a paste of such a composition the requirements of consistency, fat content, and sugar content of the final mixture were borne in mind as well as the desire to facilitate further calculation by using round figures. Furthermore, the incorporation of sugar enables the necessary grip on the rollers to be obtained when passed several times through the mill.

In preparing the milk or cream paste the constituents are brought together in a melangeur, passed three times through steel rollers or once through steel rollers and once or twice through granite or porcelain rollers, high temperature being of necessity avoided. Under no circumstances must the paste be permitted to stand for hours or days (as occurs in the usual routine of chocolate manufacture) in the intervals between the various stages of preparation. Unless this condition is complied with the whole object of this special treatment is defeated. After each passage through the rollers the mass can be subjected to a melangeuring treatment, but only at a low temperature.

By following out this procedure the milk paste becomes as completely homogenised and free from coarse grains as the finest chocolate mass and acquires the same mouldable consistency. As a result of working at a low temperature, the chief constituent of the paste—the milk or cream—remains completely unaltered, which would by no means be the case in the normal process for plain chocolate where a conching treatment for a long period and at a high temperature is involved. By the process here put forward the prepared milk and cream paste can be stored in blocks in cool storage chambers for many months without quality and freshness suffering in the slightest degree, the reason being that the milk or cream is in such homogeneous combination with the sugar and a high-melting fat as to be uniformly preserved.

All conceivable blends with finished chocolate masses can be attained with the aid of these milk and cream pastes by the simple process of thorough incorporation in the soft condition in any approved mixer. A large melangeur is to be preferred, and the formula can be altered in accordance with the manufacturer's requirements in the way of milk content, flavour, and price.

It is claimed that an enormous simplification of the whole process of manufacture is gained by this system, together with the further advantage that a refined chocolate paste prepared by the approved method of hot conching is combined with milk and cream unharmed by maltreatment and overheating.

Those concerns which have gone over to the manufacture of milk and cream chocolates on the lines here indicated have produced with the aid of best quality fresh dried milk a product with a pure and harmoniously rounded-off flavour of unsurpassable quality.

The following examples of recipes will best indicate the lines on which amalgamations between chocolate masses and milk and cream pastes should be undertaken. The first three formulæ refer to chocolate masses:

1.

Cheap Eating Chocolate.

Cacao beans	45 kgms.
Cacao butter	5 ,,
Fine sugar	50 ,,

2.

Medium Sweet Plain Chocolate.

Cacao beans	40 kgms.
Cacao butter	10 ,,
Fine sugar	50 ,,

3.

Bitter Chocolate.

Cacao beans	60 kgms.
Fine sugar	40 ,,

In order to obtain a cheap eating milk chocolate, mix 70 kgms. eating chocolate (1) with 30 kgms. milk paste.

This blend has, naturally, not a high value qualitatively, but, nevertheless, has an excellent flavour, and is easily handled from the point of view of cost. It has the following percentage composition:

Milk powder	15 per cent.
Cacao mass	31·5 ,,
Sugar	44·0 ,,
Added cacao butter	9·5 ,,

This has a total fat content of 29·5 per cent.

It will be seen that such a composition fulfils all legal requirements—*i.e.*, in Germany.

A mixture of 50 kgms. medium-sweet plain chocolate (2) and 50 kgms. milk paste yields a good grade milk chocolate with a mild flavour of the following percentage composition:

Milk powder	25 per cent.
Cacao mass	20 ,,
Sugar	40 ,,
Added cacao butter	15 ,,

This has a total fat content of 32·0 per cent.

If the manufacturer is aiming at a chocolate with a pronounced flavour of milk and in which the cacao should not be too much in the background, a cut is made of 40 kgms. bitter chocolate (3) and 60 kgms. milk paste, giving a percentage composition of:

Milk powder	30 per cent.
Cacao mass	24 ,,
Sugar	34 ,,
Added cacao butter	12 ,,

This has a total fat content of 32 per cent.

A cut of 60 kgms. medium-sweet drinking chocolate (2) with 40 kgms. cream paste gives a mild cream chocolate with 24 per cent. content of cream.

If a higher cream content is required, one may incorporate 50 kgms. of bitter chocolate (3) with the same weight of cream paste, or one may go so far as to blend 40 kgms. of the former with 60 kgms. cream paste, the cream content being then respectively 30 and 36 per cent and the cacao flavour is still not too much subdued.

Vitamin B_1 Values of Cereals

PLIMMER, Raymond, and Lowndes have continued their researches on nutrition, the first series of which were described in the *Biochemical Journal* in 1927 and 1929. In a recent paper (*Biochem. J.*, 1931, vol. 25, p. 691) further work is described, this time with reference to cereals. In their previous work on testing cereals for their vitamin B1 value, rearing of young by pairs of adult pigeons was taken as the standard of comparison. It was shown that a greater amount of foodstuff containing vitamin B was needed for rearing than for maintenance, and this fact has again been observed. The standard of maintenance for a period of at least twenty-six weeks has been adopted, and the cereals have now been classified. Some experiments were also made on the extraction of vitamin B from wheat germ, and marmite was tested for comparison with the cereals. The comparative vitamin B values were found to be: Dried yeast, 100; marmite, 67; wheat germ (bemax), 62; middlings, 40; bakers' yeast, 33; bran, 20; buckwheat, 20; millet, 13; oatmeal, 11; wheat, 10; barley, 10; malt, 10; rye, 10; dari, 10; brown rice, 10. It was previously found that the pulses had a comparative value of 13, so that the cereals are not quite so rich in vitamin B as the pulses. In the above list we take it that the middlings mean the product known as wheatfeed, which is sold as a cattle food, sometimes under the name of thirds or sharps.

The Preservation of Meats in Tin and Glass Containers

By A. SAMSON, A.R.C.S., A.I.C.

The fourth of a series of articles in which the author discusses in plain language the requirements, both scientific and practical, that are essential to the successful preservation of meats in tin and glass containers, emphasising those particular points which need careful control and observation, and which are apt to be overlooked—especially by those who do not possess a chemist or a laboratory. The first part dealt with the correct use of the refrigerator, the equipment of the brine house, the ingredients of the brine, and the practice of brining. The second part described the process of cooking and also cooking vessels, packing tables, containers, gelatine and preparation of jelly stock. The third part went thoroughly into the practice of vacuumising.

PART IV

Retorts.

SINCE, IN the preservation of meats in tin and glass, the final and most important operation is the sterilisation of the filled containers, it is essential to consider the plant—*i.e.*, the retorts—used in this operation.

Retorts for this particular industry are of two types—viz., the horizontal rectangular (Fig. 1) or tubular (Fig 2) and the vertical retort (Fig. 3). For the preservation of "tin" goods, either type is quite suitable. For glass goods, the writer very much prefers the vertical type; certainly for all-round work this has many advantages.

While it is necessary to have an overhead runway and tackle to load and unload vertical retorts, this constitutes no serious disadvantage. It will be found that this type of retort can be loaded and unloaded more quickly, the steam distribution and circulation are much improved, cooling by water is facilitated, and the action is generally much quicker.

The horizontal retort has the advantage that it requires no extra material for loading other than the iron trays.

However, in both types of retorts, there are certain features that are absolutely essential. The steam circulation and distribution throughout the bulk of the goods and the retort must be so efficient that no part of the latter should vary in temperature by more than 1° F. from any other part. If this is not the case, uneven cooking of cans will result. Furthermore, it is essential that the construction of the retort is such as to allow the dispersal of any small pockets of air that may be formed.

Retorting.

After the cans are filled and vacuumised, they are placed into the retort (of either type), which is then closed. Steam is turned on, and all blow-off cocks or pet cocks are fully opened to allow the escape of the air in the retorts. They are then half closed. If preserving above 212° F., no pressure should be allowed to build up in the retort until at least 200° F. is reached. When the required temperature is attained, the steam valve is "cracked" and the bleeder valves are opened, just sufficiently to allow wisps of steam to escape. These bleeder valves should be open during the whole of the process as they assist the circulation of the steam, thus producing even temperatures throughout the retort. At the end of the process, steam is turned off.

It is strongly suggested to packers that all cans should be cooled as quickly, and as much as possible, immediately after sterilisation. This cooling process is done by the direct introduction of cold water into the retort. The advantages of cooling are many: it stops the excessive cooking, prevents any further destruction of jelly strength than is necessary, obviates overcooked flavours and texture (a very important point), and reduces the excessive strains on the cans, which would be liable to cause trouble if the retort were opened without previously cooling the cans.

Cooling is brought about by the introduction of cold water. The water should be of a pressure at least 5 lbs. per square inch above that used for retorting.

While introducing water into retorts for cooling purposes, a counterbalancing air pressure is employed, unless water is available at very high pres-

FIG. 1.—Retorts of the Horizontal Rectangular Type.

sures. During the preservation process, great pressures are built up in the can, often to the extent of 20 to 30 lbs. per square inch. This means that although there is a pressure in the retort and surrounding the cans of 10 lbs. per square inch (when processing at 240° F.), there is an excess effective internal pressure of 10 to 20 lbs.—*i.e.*, 20 minus 10 or 30 minus 10 lbs. per square inch. If, through any reason, the effective internal pressure of the can is allowed to increase rapidly, the can is very liable to suffer damage. Suppose that during preservation a can registered an internal pressure of 20 lbs. per square inch, while the retort was at 10 lbs. per square inch; there would therefore be an effective pressure in the can of 10 lbs. per square inch. Suppose that the retort pressure were suddenly released; the effective pressure in the can would suddenly increase from 10 to 20 lbs. per square inch; this would probably burst the can. Such a calamity is liable to occur in cooling with cold water, unless compressed air is used.

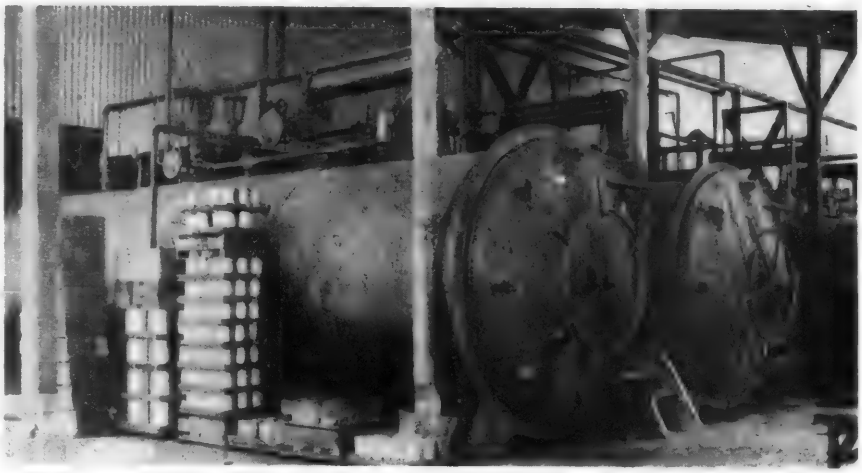


FIG. 2.—The Horizontal Tubular Type of Retort.

FIG. 3.—Harvey's Vertical Retort.

During preservation a retort is filled with steam. The immediate effect of bringing cold water into contact with this steam is to condense it, with a sudden drop in retort pressure, which means a sudden increase in effective can pressure. Therefore this sudden drop is prevented by introducing, before the water, compressed air to replace the steam condensed. This compressed air maintains a state of pressure equilibrium inside the retort.

The Cooling Process.

The process of cooling is as follows: At the end of the period of sterilisation (presumably at 240° F. = 10 lbs. per square inch), steam is turned off and compressed air, from a main reservoir, is introduced into the retort until the pressure is 2 to 3 lbs per square inch more than the processing pressure.

The cold water valve is now slowly opened; there may be a little fall in pressure, momentarily, but extra air is allowed into the retort. Gradually the water valve can be opened wider and wider, until it is fully opened. The air pressure can now be reduced slightly, as the pressure in the retort will be gradually increasing. As soon as all the cans have been covered with water the counterbalancing air pressure can be dispensed with, and the door or lid may be opened.

In cooling with water it is essential to have a water supply several pounds higher in pressure than the working pressure of the retort. Also it is necessary to have compressed air—not essentially a large quantity—at a fairly high pressure.

If the retort is urgently required, the cans may be removed as soon as they have been covered with water. They may be further cooled in some external cooling arrangement.

Always cool your products as much as possible, and handle them as little as possible during cooling. Clearer and firmer jellies will be obtained in this

way. It is advisable to allow preserved "tins" to stand a day before testing them for soundness.

The writer does not agree with the process of blowing off steam rapidly at the end of the sterilisation period in order to remove the cans. This is liable to increase the effective internal pressure of the cans so rapidly as to burst or buckle them, or to produce leaks at the joints. It is a dangerous practice, and it is strongly suggested that all preservers of meat in tin containers should introduce water under pressure into their retorts, and so cool the cans.

Glass Containers.

It was explained, in the previous article, how processing glasses with lids and springs to allow a valve action is an unsatisfactory method, mainly owing to the fact that the process is not under control. What is needed is a process which will not allow the escape of any material, and yet will permit a sufficiently high vacuum in the glass to hold the lid on perfectly tightly. Such a process is available.

In this process the glasses filled with meats are prepared in the usual way. They are pressed; the rings and lids are placed in position, and the glasses pass into a vacuum sealing machine (Fig. 4). In this machine the glasses with loose-fitting lids (clamps may or may not be used) are subjected to a high degree of vacuum. While still under vacuum, a plate is brought down on to the lids, which presses then into closer contact with the rubber rings. While the lids are thus depressed, air is allowed to enter the chamber to displace the vacuum. This inrush of air forces the lids home on to the rubber rings, and we have a perfectly sealed and vacuumised glass. The same process is applied to both automatic and Phœnix caps. In the case of the latter, after vacuumisation, the glasses are passed to the sealing machine, which curls the edge of the band under the flange of the glass. In this way there is obtained a highly vacuumised Phœnix-sealed glass, prior to sterilisation.

This prior vacuumisation has several advantages which will be discussed after the process has been explained.

If these vacuumised glasses were now processed in the ordinary manner it would be found that long before the sterilising temperatures were reached the vacuum and seal would be broken. Consequently in processing there would be no advantage over the old method of retorting.

However, this "breaking" of the seal and vacuum is prevented by using, in the retort, an extra air pressure, which has the effect of keeping the lid, during the whole process, in contact with the rubber ring. Compressed air is used, together with the steam, throughout the process, thereby preventing the lids being lifted from their rubber seatings.

Glassed goods preserved under this process have many advantages. In the first place, nothing is emitted from the glasses and nothing enters during preserving. The percentage of "dry" glasses is reduced to a minimum. The appearance of the top surface is superior to the old method. The removal of oxygen by the vacuumisation prior to sterilisation prevents the discoloration of the top surfaces of the meat, and also inhibits the discoloration of the lid. It also removes the possibility of perforations or pin-holing of the lids. One very great advantage is that any temperature of sterilisation may be used, even up to 240° to 250° F., without the customary anxieties of "dry glasses" or "rings blown out." Moreover, in this process, it is possible to cool the glasses by means of passing cold water into the retort, and this reduction in temperature is a very valuable asset. No fear need be entertained that the introduction of the cold water will crack the glasses.

The process is remarkable in minimising the percentage of what are known in the trade as "Dunnies," and the products generally have a better flavour, as they are cooked in their own juices. Above all, the process is entirely under the control of the operator.

After glasses are preserved, it is advisable to wash them while still hot, or moderately so, and then leave them to cool down, until the jelly sets. It is bad policy to handle glassed goods when the jelly is almost at the setting-point. If clear, bright jelly is desired, leave the hot glasses, after washing, to cool without any interference.

Storage of Preserved Meats.

Whether in tin or glass, preserved meats should be stored in a cool, dry storehouse. Too low a storage temperature for glass goods is, however, not desirable, because that would cause so much contraction that the meat and jelly would actually

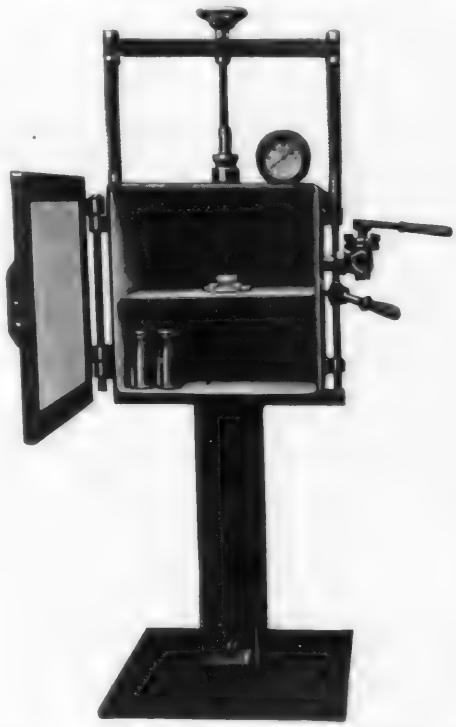


FIG. 4.—Vacuum Sealing Machine for Glass Jars.

(Courtesy of John Fraser and Son, Ltd.)

shrink away from the sides of the glass, leaving what appear to be "air-spaces," which detract from the appearance of the glass. Increase in temperature will not always remove these "air-spaces."

In the case of tinned goods, owing to the collapsible nature of the container, the tinplate takes up this contraction and shrinkage, and so no harm is done. Hence low temperatures — without actual freezing—are desirable in the case of tinned meats.

It is the experience of the writer that direct light rays have a harmful effect on glass meats, especially tongues. If exposed to direct light rays, the fat in glasses is liable to be bleached. Moreover the pickle meats, especially tongues, lose their delicate bloom and appear to take on a rather dull colour, with a touch of grey. It is therefore essential that glassed meats should be stored away from direct light, especially sunlight; it is not necessary to have complete darkness.

It is fatal to the high quality of preserved meats—once they have been processed and set—to allow them to attain such warm temperatures as to cause the jelly to liquefy, and the meats to soften again. Such "remelted" materials never have the same bright appearance. That is why the writer disagrees with the system of processing meats in tin and glass, allowing them to set, and then washing them next day in warm water in order to remove the jelly and fat on the exterior.

Incubation.

By "incubation" is meant subjecting the preserved materials, in tins or glass, to a temperature of 95° to 105° F., for at least a week.

All concerns should possess some chamber or cupboard or room wherein it is possible to maintain the temperature of 95° to 105° F. all day and all night. In this "incubator" should be placed samples taken from every consignment of preserved goods. It should be made a fixed rule that no consignment should be allowed to leave the factory until the incubator has furnished its results on the samples.

Incubators provide much useful information; they indicate bad soldering and defective double-seaming, or insufficient sterilisation.

Conclusions.

Meat preserving is definitely a scientific business. For many years the preservation of meats in tin and glass containers was carried on in this country, and successfully, too, without any scientific knowledge or assistance, or even a proper understanding of the processes involved. To-day, practically all preserving is discussed on a technical basis, and the writer feels sure that the manufacturers of preserved foods would be the first to admit that it is all to their advantage.

Chocolate Wafers

WE have recently received from Josef Stark, of Salzburg, Austria, well known on the Continent as the author of a handbook on the manufacture of sugar-confectionery, *Die Zuckerwaren Industrie* (Leipzig, 1927), a communication describing the manufacture of chocolate wafers in Austria.

Apparently, this class of confectionery has become extremely popular on the Continent, and it also enters into the export trade. In Austria practically every chocolate factory is engaged in its manufacture, enabling chocolate residues to be used up profitably.

According to Mr. Stark, a good recipe for wafers is as follows:

Flour ...	23 lbs.	Water	28 pints
Sugar ...	1 lb. 2 ozs.	Coconut fat ...	9 ozs.
Egg yolk	½ pint	A little colouring matter.	
Salt ...	1 oz.		

This mixture is worked in a suitable mixing machine to a smooth batter, entirely free from lumps. In Austria the baking is usually carried out in circular or rotating ovens, the "wafer irons" being rapidly arranged on a horizontal, circular plate. As an iron is filled and placed on the plate, it is given a part turn, thus moving the iron into the oven and discharging one which has been baked.

The wafers must be stored for ten days in a warm, dry place before the chocolate or other material is applied. Stark says that spreading is often done by hand, although efficient machines for the purpose are now available. On this point it is interesting to note that another correspondent, who saw wafers being made in Italy, informs us that use is made there of a neat, automatic jam or chocolate spreading machine which performs its work rapidly and with the minimum number of breakages. At the Italian factory a better baking method is employed, involving large iron plates, which, after being heated by gas and charged by having the batter poured between them, are clamped together, baking being carried out by the residual heat.

Cereal Chemistry in 1931

(*Continued from page 7.*)

gold standard by Great Britain brought about a sharp rise commensurate with the reduced value of sterling, but even in spite of this the price of wheat is remarkably low. The part Russia will play is still uncertain; she certainly has succeeded by dumping methods in disturbing the wheat market, but there are no authentic figures to indicate her future position. The political situation has changed to such an extent, and the whole world is in such a state of flux, that prophecy would be unwise and unsafe. Let us leave it by saying that in 1931 the bread of Britain has been better in quality and lower in price than ever before, and cheaper and better than anywhere else in the world.

View in the Imperial Biscuit Works of Messrs. Macfarlane, Lang and Co., Ltd., recently erected at Osterley Park, London.

The Bakery Trade of 1931

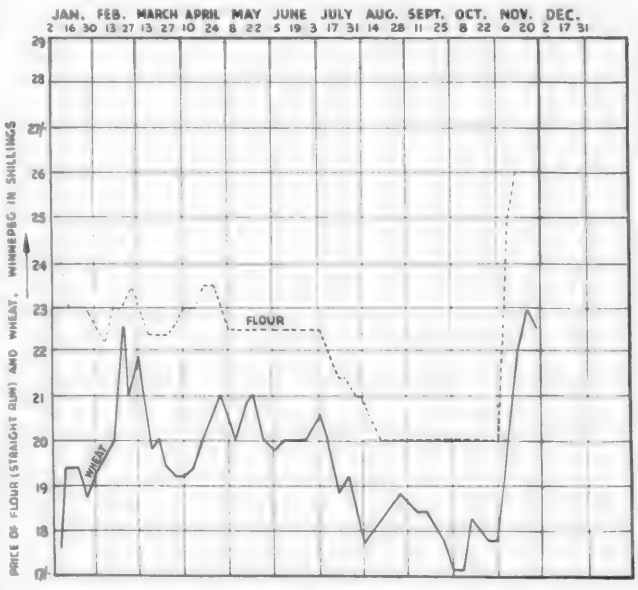
By E. B. BENNION, M.Sc.Tech., A.I.C.

Head of the National Bakery School, London; Joint Author with James Stewart of "Cake Manufacture," 1930.

THE PAST year has been a notable one for bread and flour confectionery manufacturers. Prices of raw materials fell to unexpectedly low levels, so that some commodities have sold, retail, more cheaply than in pre-war days. Overhead costs, unfortunately, and rents, rates, and taxes, have by no means followed suit, and thus, although the majority of the trade have done a reasonable volume of business, the margin of profit has become narrower. At the same time, however, numerous firms who have had the courage to adopt a progressive policy, in spite of discouraging conditions, have greatly increased their turnover.

Breadmaking.

The past year saw flour cheaper than it was ever known before the war, the price of straight run grades falling as low as 17s. per 280 lbs. With this reduction in the price of flour, bread has fallen in price accordingly. There has been, however, a tendency for bakers to use higher grade flours, so that patents have been in great demand. So much has this occurred that the millers have experienced some difficulty in disposing of their lower grade flours. As a result, these have been sold at considerably lower prices, and for those who have been sufficiently enterprising to make second grade bread a good trade has been developed. This has been particularly noticeable in Lancashire, where the economic conditions have had the effect of restricting the purchasing power of the people, and as a result these "seconds" have found a good market. Such bread has been sold as cheaply as 2½d. per 2-lb. loaf and has been of an extremely good quality. The chart below shows the fluctuations in price of flour (straight run grade) for the twelve-month period. A comparison curve for wheat at Winnipeg makes interesting reading, since it shows the influence of Winnipeg on flour prices in this country. The dotted curve shows the correction made to pounds sterling.



Research on Bread Quality.

There has been a general desire all over the country to improve the quality of bread, and during the year several improvers have been marketed to aid in this.

Research has been carried out by several workers during the past year, following on previous work, in the use of dried whey as a bread improver. An improved product—a blend of whey and milk powder—is now being marketed which possesses properties rather different from ordinary milk powders, as the mineral content is much higher. Such a product might be of especial value for the feeding of school children in conjunction with the various milk feeding tests which are being carried out in various parts of the country.

Research by Kent-Jones and Amos on the bacteriology of flour and rope has contributed to the missing files on this most important subject. The work on rope, which was a sequel to the former, has confirmed the previously held opinions and has established the relationship between the spore content of a flour and the likelihood of trouble developing.

In America much research has been carried out on factors affecting the efficacy of the experimental baking tests which has its place in trade literature. The cause of holes in bread has been the subject of investigations both in this country and America. The trouble in this country was caused chiefly by the large amount of Russian wheat used in conjunction with Canadian wheats. Flour produced from these was particularly difficult to ferment when certain blends were employed, and frequently caused trouble if the ovens were at all hotter than usual. Owing to the instability of the gluten of the Russian wheats, the loaves were unable to expand evenly, and trouble with extraordinarily large holes was the result.

New Plant and Machinery.

As far as machinery is concerned the trend towards the open pan mixer has been followed, and one of the notable introductions is a new portable half sack mixer which has been marketed by Baker Perkins, introducing a new principle. Instead of a moving arm mixing the dough in this machine, the pan revolves at a much higher speed than is usual for such a machine and the working arm remains stationary. It is possible, however, to adjust the distance between this and the bowl as required. By the centrifugal force developed the dough is mixed. This machine is equally well suited for mixing soft doughs or stiff mixes such as marzipan, and the arm can be adjusted as required. The mixer and motor are mounted on castors, so it can easily be moved where required. This feature should prove of value in bakeries where both smalls and confectionery have to be made and space will not permit a permanent dough mixer to be installed. Many new dividers and moulders have been introduced, and those with trades of thirty sacks and upwards are now considering the advisability of installing at least a divider.

Confectionery.

All confectionery raw materials have been cheaper, and as this has applied specially to fats, including butter, it is good to know that this last is gradually regaining its lost place in many bakehouses.

Decorative work has developed on more modern

Another View in the Imperial Biscuit Works, showing the Packing Department.

lines, and, as a result, a general improvement in artistic confectionery has been noticed. Tints instead of colours are the general rule to-day, and this, together with the dainty nature of modern productions, has played its part in developing the trade.

Numerous products have been introduced with the object of improving decoration, but there have been no outstanding advances in other directions as far as progressive ideas are concerned. The cheaper classes of products have been improved as a result of more scientific methods, but, unfortunately, while there has been provided a wide range of cheap products, it means that qualities, especially of taste, have taken second place. This perhaps is a phase through which the trade is passing, and it seems likely that the demand for confectionery which has good eating and keeping qualities will return, and the family baker is preparing for this, when it comes.

Recent Advances.

The use of lecithin in sponges and cakes has been investigated in America and in this country, and investigations on the effect of different types of whisks in sponge making machines have also been carried out. A patent has been taken out for an attachment for the ordinary vertical cake machine whereby the eggs can automatically be added to batters at a given rate, thus eliminating the risk of curdling due to the addition of too great quantities at a time—this should prove particularly valuable to the small baker.

The question of the effect of various sugars on cake making and their capability of holding water has been investigated in America. Work has also been done in examining the effect of sugar on the foam structure of pound cake, the order in which the ingredients should be added to cake batters, and the size of crystals in icings. Finally, as in previous years, more attention has been paid to the actual display of goods, in shop windows, in suitable wrappings, and considerable progress has been made in the production of containers, wrapping papers, and similar materials, which aid the baker in displaying his wares in a manner worthy of their quality.

A View of J. Harrison Carter's Grinding and Sifting Plant for Producing Icing, Pulverised and Castor Grades of Sugar, recently Installed in the Imperial Biscuit Works of Messrs. Macfarlane, Lang and Co., Ltd. The Output of this Plant is 26 cwts. per Hour.

The photograph shows the automatic feeder with hopper into which the sacks of sugar are tipped, the elevator conveying the material to the disintegrator, the sifter to take out the various grades, and, on the right, the dust balloon.

Enquiries

Enquiries are dealt with immediately on receipt, and the desired information is communicated in full by private letter. The replies given below are merely brief abstracts or indications that the names and addresses, or whatever may have been requested, have been supplied. Any further information supplied to us relating to the questions appearing below will be passed on to the enquirers. **N.B.—Enquirers are requested to use the special form in the advertisement section.**

436. *Will you kindly put me in touch with firms making pea and lentil flour for the preparation of soup.* (Gloucester.)

This was done.

437. *I should be pleased to have names of supplies of plant for small scale carton sealing—both ends.* (Derby.)

Names supplied.

438. *We understand that there are certain manufacturers of artificial sausage casings, and we should very much appreciate if you could put us in touch with a representative firm who would be prepared to do an export business.* (New Zealand.)

This was done.

439. *Referring to Enquiry No. 428, we should also like to know the names of manufacturers of a small hand-driven machine for removing the stones from dates.* (London.)

Names of firms supplied.

440. *Could you please let us know the names of manufacturers of wooden boxes for holding 2, 4, and 8 oz. glass jars? We are also interested in millboard cases for the same purpose.* (Edinburgh.)

This information was supplied.

441. *We are looking for a glass-lined copper still or one made of stainless steel. Perhaps you would put us into touch with possible suppliers.* (London.)

Suggestions were made.

442. *Do you happen to know where "Clarase," a diastatic enzyme, can be obtained?* (Birmingham.)

We have not heard of this before. Perhaps the textile research workers at Shirley Hall, Manchester, may know, as they are engaged in investigations on enzyme action.

443. *Would you kindly favour us with recipes for fish pastes.* (Grimsby.)

A selection of these was furnished as a basis for experimental work, which should be undertaken by the enquirer himself so as to build up a paste from his available raw materials to suit the particular market he has in view. Much useful information may be obtained by careful examination of various brands with the aid of "panning" operations and the microscope.

444. *We are anxious to get in touch with suppliers of machinery for the manufacture of a breakfast food similar to the sample submitted.* (South Africa.)

No doubt the type of corn flakes you have in mind are produced by first softening the grain by steaming, then flaking between rollers, and finally drying and toasting. The names of firms able to supply steaming, flaking, and drying plant for this purpose were submitted. A toasting plant could readily be devised, say, on the principle of passing the flakes on a wire belt between upper and lower plates heated by gas or electricity.

445. *We should be glad to have further particulars of the new sardine canning process mentioned in your November issue on page 313.* (Cornwall.)

Source of information was indicated.

446. *We shall be glad if you will advise us of the names of makers of fully automatic double seaming machinery suitable for fruit and vegetable tins giving an output of not exceeding 60 cans per minute, and which can be obtained on the hire system; also particulars of suitable exhaust boxes for similar output.* (London.)

Suitable names submitted.

447. *Will you send me the name and address of the firm manufacturing the multifiller machine described on page 304 of the Trade News of your October issue.* (Derbyshire.)

The required information was furnished.

448. *We have noticed in your November issue the advertisement of a new product, "Flexiglass," and would be glad to have further information concerning this.* (U.S.A.)

The enquirer was put in touch with the advertiser in question.

449. *We shall be glad to be put in touch with any of your advertisers who specialise in* (a) *plant for the manufacture of tomato ketchup, and* (b) *machinery for extracting and deodorising coconut oil, to handle about 15,000 gallons per month.* (British Guiana and Barbados.)

This was done.

450. *Could you please give me some names of makers of mixing machinery and drying plant for custard powder, dried soup, jelly crystals, and similar products?* (London.)

Information supplied.

451. *Please supply times and temperatures of sterilisation for the canning and bottling of fruits and vegetables of various kinds, together with strengths of syrup or brine used.* (U.S.A.)

These data were furnished. Full particulars will be given in the next issue of the *Food Industries Manual*.

452. *Kindly inform me of makers' names of machinery for making chocolate and sugar coralettes. Also the names of makers of round cardboard containers with metal bottom and top, lever lid, capacity 7 and 14 lb.* (Blackburn.)

Information supplied.

453. *Please let us know the address of the firm who make Soyolk.* (Edinburgh.)

This was done.

454. *Required, name and address of vendors of an appliance for cleansing casks, using steam.* (Birmingham.)

Name of firm supplied.

455. *Can you supply us with any information on the curing of pigs' maw and the manufacture of tripe?* (Liverpool.)

Pigs' maws or stomachs are cured as follows: The stomachs are cut open and emptied of their food contents; they are then washed in cold water. After washing thoroughly, they are turned inside-out and all slime is removed by squeezing with the hands. The maws are then placed in some more cold water, after which they are scalded. After scalding they are returned, and are packed in dry salt.

Pigs' maws are often cut up small and turned into grease and meat meal, generally being mixed with other material such as bones, soft offals, etc.

Tripe is made from the first, second, and fourth compartments of the stomach of the ox (rumen, reticulum, and abomasum), whilst in some places the "fat end," or rectum, is also used.

The bellies are washed and cleaned from food, etc., turned inside-out and the mucous membrane scraped,

They are then placed in cold water for another washing, and are cut open, and afterwards cooked.

After cooking, the bellies are immersed in cold water containing lime and soda, usually about 1 lb. of lime and 1 lb. soda per 20 bellies (but this formula varies in different manufactories, and other bleaching agents may be added in some places). The tripe is left here for about twelve hours, when it is removed and washed in cold water, after which it is ready for sale.

456. *We would be greatly obliged if you could send us some information concerning the manufacture of puffed rice.* (Holland.)

The process would appear to consist in steaming the rice under pressure and then cooling under vacuum; at least that is in broad outline the way the process is carried out. As to the firms supplying plant for this purpose, we should be glad to hear of anyone who has made the necessary equipment. So far as we know, the Quaker Oat Co. of America own and work the patents for this type of plant, but, of course, there may be other designs of plant, and, if so, we should be glad to hear from anyone who has had experience in this direction.

457. *Required, commercial recipe for best variety of apple mincemeat.* (Stirling.)

Mr. James Stewart gives the following, although, on account mainly of the brandy, it is doubtful if they are suitable as ordinary commercial recipes:

(1)	(2)
6 lbs. suet.	6 lbs. suet.
12 lbs. apples.	20 lbs. apples.
15 lbs. currants.	12 lbs. currants.
7 lbs. sultanas.	2 lbs. sultanas.
8 lbs. raisins.	7 lbs. raisins.
4 lbs. mixed peel.	2 lbs. mixed peel.
10 lbs. brown sugar.	12 lbs. brown sugar.
2 ozs. mixed spice.	3 ozs. mixed spice.
1 oz. ground nutmeg.	1 oz. ground nutmeg.
Zest and juice 15 lemons.	Zest and juice of 8 lemons.
Zest and juice 10 oranges.	Zest and juice of 6 oranges.
½ pint rum or brandy.	½ pint rum or brandy.

In the preparation of mincemeat, it is important that all the ingredients should be kept free from flour, to avoid fermentation. The suet should be finely minced; the apples are chopped up in small pieces, after coring and paring, or tinned apples may be used. When the mincemeat has been thoroughly mixed it should be stored in clean, dry receptacles, which should be covered over with greaseproof paper and then have the lid replaced. It should then be stored in a cold room for about six weeks before sending out for sale.

If selling in 1-lb. and 2-lb. jars, it should be thoroughly mixed before filling into the jars; then these should be covered over with waxed paper and sealed down to exclude the air. If they are stored in a cold room, about 40° F., for a period, the mincemeat matures without fermentation taking place, and should keep well and fresh for a prolonged period.

458. *Would you kindly let us have the names and addresses of firms who supply metal waiter-trays.* (South Wales.)

Names and addresses furnished.

459. *Could you give us a formula for sherbet?* (Bristol.)

Sherbets may be made up on the following lines:

Good Quality.	*Medium Quality.*
1 lb. tartaric acid.	5 lbs. tartaric acid.
1 lb. bicarbonate of soda.	6 lbs. bicarbonate of soda.
2 lbs. sugar.	28 lbs. sugar.
2 drams essence of lemon.	1½ oz. oil of lemon.
	One or two drops otto of roses.

It is important to have each ingredient thoroughly dry before mixing. The flavour should be well mixed with part of the sugar, then passed through a fine sieve and mixed with the rest.

American sherbets are quite different, containing gelatine, sugar, cream, or honey or eggs, carbonated beverage and flavour. The mixture is frozen. Recipes for these can be supplied if required.

460. *Could you let me have the names of firms making plant for the manufacture of biscuits?* (Blackpool.)

Names and addresses of these firms were supplied.

461. *Will you kindly give us a recipe for preparation of gum-pastilles similar to "Pastilles Valda."* (Riga.)

"Valda-Pastillen," as manufactured in Germany, are said to contain:

Eucalyptus oil	·0005 gm.
Menthol	·002 gm.
Sugar	·5 gm.
Gum	·5 gm.

Tinted with chlorophyl.

Similarly, "Pastilles d'Eucalyptus au Menthol" consists of:

Gum acacia	600 gm.
Sugar	400 gm.
Menthol	1 gm.
Eucalyptol	1 gm.
Alcohol (90 per cent.)	2·5 gm.

Tinted with green colour. Make into pastilles, each weighing 1 gm.

462. *We shall be glad to learn whether you can furnish us with a formula for the manufacture of tomato paste and Parmesan cheese.* (London.)

As regards tomato paste, it is impossible in the limited space available here to give a satisfactory reply. Reference might be made for details to Campbell's book. The following is a brief note bringing out the main points. Reference should also be made to American papers by Kohman and others:

The light grade has a solid content of about 15 per cent.; the medium, 23 to 25 per cent.; and the heavy, about 32 per cent. Tomato pulp is prepared in the ordinary way. Concentration is carried out in open or vacuum pans. In some cases half-neutralisation of acidity has to be made by addition of sodium carbonate solution to the pulp while cooking. About 1/25 ozs. of salt per gallon of finished paste is added (in solution) when the paste is about finished. Oil of sweet basil is sometimes added, using 6 ozs. of a 1 per cent oil solution for 70 gallons of finished paste, the addition being made when cooking is completed. Carmine colour may also be added, as well as a thickening agent, such as agar or pectin. There are various methods of judging the end point of cooking by specific gravity determinations—*e.g.*, by the Strasburger method—or by determination of solid content by the refractometer.

After filling and capping, the cans are immediately sterilised (No. 2 cans at, say, 212° F. for 85 minutes in vertical retorts; in continuous retorts the time may be less).

One ton of tomatoes is said to yield about 217 gallons of thin pulp and 1,750 cans—5 ozs. each of paste containing 15 per cent. solids.

The tomatoes must be ripe, well sorted and washed, and quickly handled with rapid cooking and under strictly hygienic conditions.

The manufacturing processes of Parmesan or Lodian Cheese have been handed down from the Middle Ages by cheesemakers in Lodi, Milan, Parma, and Pavia in Italy. It is said to owe its high flavour to local conditions. One account states that the rennet is added at about 120° F., and an hour afterwards the curd is cut very small and slowly heated to 150° F., during which the curd separates in small lumps and becomes dry and brittle and requires very heavy pressure when put to press. It is turned and salted daily for about one week. A few pinches of saffron are thrown in to colour and flavour it. About a fortnight after making, the outer crust is cut off and the new surface varnished with linseed oil. One side of the cheese is coloured red. There are two varieties, *Maggenga* (April to September) and *Invermenga* (October to April). It is hard, dry, and grainy. The ordinary composition is given as: Water, 32·5; casein, 43·6; nitrogen, 6·86; fat, 17·1; lactose, 6·69; ash, 6·2.

Trade Notes

Dewey and Almy's Laboratories.

A well-deserved tribute to its progress and development in industrial research has been paid to the Dewey and Almy Chemical Company, Cambridge, Mass., U.S.A., through the selection of its research laboratories as one of those visited by the National Research Council of America.

The Division of Engineering and Industrial Research of the National Research Council recently arranged for a

tour through some of the outstanding laboratories of industrial plants. Among those selected as being worthy of a visit were the laboratories of the Dewey and Almy Chemical Company, Eastman Kodak Company, Massachusetts, Institute of Technology, United Drug Company, and Westinghouse Electric and Manufacturing Company.

The Dewey and Almy Chemical Company, which is represented in England by Dewey and Almy, Ltd., Edmonton, London, was started in 1919, and now has no less than six factories operating in different parts of the world, an average of one new factory in every two years. All these factories are servicing the can-making industry, for which, in addition to the glass-packing industry, they have made many valuable and important contributions in their manufacture of can-sealing compounds, cap compounds, soldering fluxes, and labelling adhesives.

* * *

Cellulose Wadding.

A product with very varied applications for the packaging of all goods, especially those of a fragile nature, is now being marketed by the Cellulose Wadding Supplies, Ltd., of Manchester. Known as "Welatex," it takes the form of a soft, blanket-like material, possessing great resilience and pliability, and it is available in a variety of thicknesses, shapes, and colours. It can be corrugated, and provided with any type of backing required, and it is readily made into bags or sleeves. For bottled goods it is pre-eminently suited, as its highly absorbent nature, in the unlikely event of leakage or fracture of any one bottle, prevents any liquid remaining free to damage the remainder, while the makers guarantee that it will not tarnish or impart any odour to goods packed in it. This material, which is of British manufacture throughout, is also finding extensive use for confectionery packaging, especially for chocolates, its soft, resilient nature rendering it specially fitted for preserving the finish of high-class goods.

* * *

Almond Growing in South Australia.

The Department of Agriculture of South Australia has decided to launch a campaign to stimulate almond growing in that State, according to the chief horticulturist's report to the annual conference of the Fruit Growers' and Market Gardeners' Association.

For the five years ended June 30, 1931, the average annual Australian production of almonds has been 384½ tons, and the imports approximately 1,258 tons.

There are about 2,000 acres under almonds. South Australia produces 303 tons or 78 per cent. of the Commonwealth crop, and the State has about 1,300 acres of these trees.

* * *

Germany's Margarine Export Trade.

It is only within the past five years that Germany has marketed margarine abroad. Exports in 1927 amounted to 1,993 metric tons, and in the subsequent years were as follows:

1928	3,181	metric tons.
1929	2,615	,, ,,
1930	4,187	,, ,,
1930 (8 months)	2,498	,, ,,
1931 (8 months)	10,727	,, ,,

The increase in export shipments is explained as being attributable mainly to a larger volume of orders from Russia, which country takes seven-tenths of the total exports. Czecho-Slovakia and the Saar region are the only other important buyers.

* * *

Production of Olive Oil in Portugal in 1931.

The production of olive oil in Portugal in 1931 is estimated as being from 60 to 70 million litres, while present stocks on hand are said to amount to approximately 2 million litres. The current price is 3½ escudos per litre (approximately 8d. par).

Harvesting of this year's crop began during the first week in October, which is earlier than usual, and it is believed that the entire crop will be harvested by the end of the first week in November.

The quality of this year's olive crop is said to be good, and it is estimated that it will amount to 600,000 metric tons, of which two-thirds will be used in the manufacture of olive oil. Approximately,330,000 hectares are devoted to olive growing, and it is believed that this figure has a tendency to increase.

* * *

New Process for Salmon Canning in Canada.

An innovation in the processing of canned salmon is reported by the Department of Fisheries, according to information from Vancouver. The new process is to skin the fish before canning, instead of the usual method of canning with the skin on. It has been successfully carried out during the past season at a cannery on the Fraser River, and, according to fishery officers who inspected the plant, the resultant product is satisfactory.

The salmon are first killed by hand and carefully washed in water under pressure. They are then passed on to a bench where women employees carry out the skinning process. The girls are supplied with a wooden clamp tool and a palm knife with which, after

starting the skin at the tail, they are able to completely flay the fish in four strips. The salmon then goes to other benches for cutting, packing and cooking in the customary way.

* * *

Danish Trade in Canned Fruit and Vegetables.

The increased output and low price of Danish canned vegetables have made it increasingly difficult for foreign suppliers to compete in this market and imports continue to decline, according to information from Copenhagen. The reduced imports have doubtless been partially due, however, to adverse conditions within Danish agriculture and trade during the past year. During the first six months of 1931 Danish imports of canned vegetables totalled only 88,400 pounds, valued at £4,000 par, compared with 166,200 pounds and £4,500 par during the corresponding period of 1930. About 70 per cent. of the imports came from the United States and consisted very largely of asparagus, pickles, peas, and corn. The balance of the imports came from England, Belgium, France, Germany, and Italy. Danish canned asparagus has been retailing at Kr. 2.50 to 2.80 per kilo (about 1s. 6d. to 1s. 8d. per pound) against American asparagus at Kr.2.75 to 3.15 for 2½'s.

Although the quality and sale of Danish canned fruit has improved, it has not, as yet, offered serious competition to the imported product, and American packed peaches, pineapples, apricots, and pears continue to obtain increased sale. Imports of foreign canned fruit totalled 912,260 pounds, valued at £21,000, during the first half of 1931, compared with 833,100 pounds and £23,000 during the same period last year. Over 75 per cent. of the imports arrived from the United States, and the balance came from Hawaii, Italy, England, Germany, Norway, and Australia. Danish canned plums and apples retail from Kr. 1.00 to 1.50 per kilo (6d. to 10d. per pound).

Since the latter part of September, the Danish krone has depreciated by about 20 per cent., and the uncertainty with respect to future exchange rates and the business outlook have stopped canned goods importers from placing further orders abroad for the present.

* * *

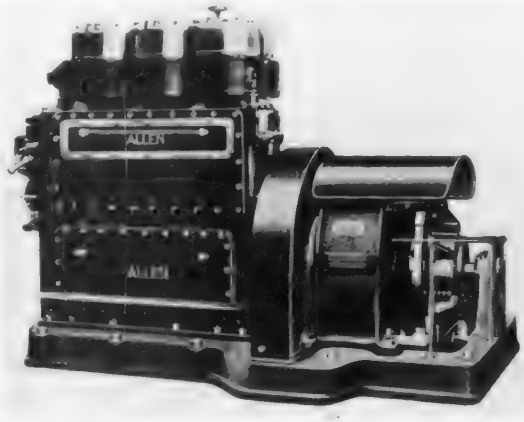
The "Allen" Airless Injection Diesel Engine.

The first "Allen" internal combustion engine, designed to run on paraffin, was built in 1906, and this met with immediate success. Since that time continuous development in design has been made, and the contrast between this early engine and the present "Allen" oil engine is very marked.

As a result of long and specialised experience, careful research, and extensive tests, the present "Allen" airless injection diesel engine is claimed to represent the very latest practice in prime mover design.

This type of engine incorporates many special features, making it reliable and robust, and capable of meeting all conditions of service, yet most economical in operation and upkeep. It is built in various sizes from 50 b.h.p. upwards, and has a very wide application. It is suitable for auxiliary purposes on board ship, for supplying power and lighting for factories, for driving centrifugal pumps for waterworks, sewage works, and irrigation works, for electric supply, refrigeration, etc.

The engine is constructed with from two to eight cylinders according to the



power required; the working parts of all engines, having cylinders of the same dimensions, are kept as far as possible the same size, enabling the parts to be produced in quantities and ensuring interchangeability.

It is most suitable for ordinary lighting and power purposes, but for such duties as driving alternators in parallel the two-cylinder engine is not recommended.

The engine being of the vertical, single acting type, working on the four-stroke principle, one stroke in every four is a power stroke. On the first downward stroke of the piston fresh air is drawn into the cylinder through the inlet valve, and in the following upward stroke the air is compressed in the cylinder to about 420 lbs. per square inch. Near the top dead centre position the liquid fuel is injected into the cylinder in such a way that it can burn regularly without sudden rise of pressure and at highest economy, the ignition taking place as the fuel is brought into contact with the heated compressed air. The heat of the compression is of sufficient intensity to ensure ignition of the fuel. During the combustion stroke the gases in the cylinder expand, and, acting on the piston, work is developed on the third and downward stroke.

The fourth and last upward stroke drives the products of combustion from the cylinder through the exhaust valve, after which the cycle is again repeated.

The characteristic feature of the above working process is the absence of fuel in the cylinder until the compression stroke is almost completed, which permits of a very high ratio of compression being used without fear of explosion before the dead centre, and enables a very high economy in fuel consumption to be attained.

The pump provided for supplying fuel to the injector is mechanically operated from the crankshaft and is connected to the governor, whereby the pump is adjusted automatically in such a way that only a quantity of oil corresponding with the momentary load of the engine is pumped through the fuel injector.

Both the fuel and lubricating oil consumption are extremely low, the former not exceeding 0·39 lb. and the latter 0·005 lb. per b.h.p. per hour at full load, in the case of all engines except the smallest size of engines, in which the lubricating oil consumption is 0·007 lb. per b.h.p. hour at full load. Special attention has been given to the silencing arrangements. The air before entering the engine is drawn through an air silencer, lined with a sound-deadening material. The exhaust silencer is provided with specially designed baffles, which are exceedingly efficient.

The governor regulates automatically the consumption of fuel oil at different loads, and it is fitted with adjusting gear to enable the number of revolutions to be varied whilst running.

The governing of the engine is exceedingly fine, and it is possible to meet all the usual requirements for industrial purposes, and for the driving of electric generators, where extremely sensitive governing and parallel operation are required.

The normal rated output of all engines given by the makers is the power which can easily be carried for a period of twelve hours continuously, and in the case of overload an increase of 10 per cent. of the normal output can be maintained for two hours. For continuous day and night running the normal rated output is reduced by 10 per cent. This is in accordance with the British Engineering Standards Association

New Companies

HILDEBRANDT'S, LIMITED. (260641.) 145, Stretford Road, Manchester. To take over the bus. of a baker and confectioner cd. on by E. Hildebrandt at Chester Road, Old Trafford. Nom. Cap. : £2,000 in £1 shares.

INDIA TEA DISTRIBUTORS, LIMITED. (260720.) 33, Old Broad Street, E.C. 2. To carry on the bus. of mnfrs. of and dlrs. in tea, coffee, cocoa, etc. Nom. Cap. : £100 in £1 shares.

PERCY GORING, LIMITED. (260696.) Brougham Chambers, Wheeler Gate, Nottingham. To take over the bus. of a wholesale fruit and potato mcht. cd. on by Percy Goring at Sneinton Market, Nottingham. Nom. Cap. : £3,000 in £1 shares.

POULTRY AND EGG PRODUCERS, LIMITED. (260697.) 16, Queen's Lane, Newcastle-upon-Tyne. To take over the bus. of a poultry farmer cd. on by J. S. Jensen at Carr's Gate East, Bardon Hill, Northumberland. Nom. Cap : £1,000 in 3,000 ord. shares of 1s. and 850 pref. of £1.

A. G. PAYNE AND SONS, LIMITED. (260601.) 88, King Street, Maidstone, Kent. To carry on the bus. of millers, corn and genl. produce mchts., etc. Nom. Cap. : £1,000 in 1s. shares.

BARTON HALL, LIMITED. (260667.) To carry on the bus. of mnfrs. of and dlrs. in confectionery, etc. Nom. Cap. : £300 in £1 shares.

EAST DEVON EGG PRODUCERS, LIMITED. (260675.) Hunthay, Axminster. To carry on the bus. of dlrs. in and producers of dairy, farm, and garden produce, etc. Nom. Cap. : £1,000 in £1 shares.

WALKER AND WICKENS, LIMITED. (260630.) To take over the bus. of dairymen cd. on by A. R. Walker and F. A. Wickens at 8, Haynes Road, Leicester. Nom. Cap. : £5,000 in £1 shares.

HEALTH FOOD STORES, LIMITED. (260590.) 5, Market Walk, Huddersfield. To take over the bus. of a health food stores and confectioner cd. on by Beatrice Crossland at Huddersfield. Nom. Cap. : £1,000 in £1 shares.

TEA EXPORT, LIMITED. (260574.) 119, Cannon Street, E.C. 4. To carry on the bus. of wholesale tea dlrs., etc. Nom. Cap. : £100 in £1 shares.

HAZLEWOOD AND CO. (PRODUCTS), LIMITED. (260531.) Empire Works, Great Northern Road, Derby. To take over the bus. of jam mnfrs., druggists, etc., cd. on by Hazlewood and Co. (Derby), Ltd., and its liquidator at Derby and elsewhere. Nom. Cap. : £7,000 in £1 shares.

MORISON AND ROBINSON, LIMITED. (260540.) To acquire the goodwill, stock-in-trade, assets, etc., connected with the bus. of sugar mchts. cd. on at 394a, Corn Exchange, Manchester, as Morison and Robinson. Nom. Cap. : £5,000 in £1 shares.

MINSTER CAKES, LIMITED. (260505.) To carry on the bus. of cake and biscuit mnfrs., etc. Nom. Cap. : £500 in £1 shares. Dirs. : Not named.

GOODCOOKS, LIMITED. (260530.) To carry on the bus. of pastrycooks, bakers, etc. Nom. Cap. : £1,000 in £1 shares (600 pref. and 400 ord.).

Correspondence

To the Editor.

DEAR SIR, *December* 14, 1931.

As doubtless you already know, we have a large up-to-date factory at Port Elizabeth where we can South African "Gold Reef" and "Sakabula" pineapple and other fruits and jams.

I have by this mail received a letter from Mr. S. Craig Bain, our general manager, and I feel sure that the following extract from this letter will interest your readers.

"We have noticed with fullest possible satisfaction the tremendous development that has been made by British manufacturers in catering for the can maker and the canner. I can go further and say that at a meeting of the South African Food Canners' Council, at which I occupied the chair last week, expressions of satisfaction in this connection were very general and I feel confident that in the canning trade here there is a very pronounced desire to divert future orders to Britain that previously automatically went to America, because of its one time monopoly in this class of machine. We are 'all out' to buy British and buy Empire."

Yours faithfully,
R. L. GILBERT.

London Manager, African Canning and Packing Corporation, Ltd.

A Correction

WE tender our apologies to Mr. A. Samson and to Mr. Lock for an error in the spelling of their names as recorded in the report of the Proceedings of the Canners' Convention published in the December issue.

The Manufacture of Marzipan

(*Continued from page* 11.)

articles comprising marzipan pastry, creams, tarts, macaroons, and also the extremely popular seasonal and decorated articles so much in favour with both young and old for their excellent and alluring taste.

The most extensive consumers of the crude marzipan mass are certainly the great speciality factories which have come into such prominence of late and which are occupied the whole year through in making special additions to the crude mass so as to prepare delicious and attractive tarts, fruits, figures, flowers, etc. These are marketed in a wholesome and hygienic condition and in forms that are true to life, with the result that their pleasing and arresting appearance have gained for them an extensive vogue, not merely in England, but, of late, in other countries also. The writer is firmly persuaded that a skilful confectioner thoroughly conversant with marzipan production might do a splendid business providing, always, that he builds up a reputation for quality.

Financial News

(SPECIALLY COMPILED BY S. HOWARD WITHEY, S.F.INST.A.C., F.C.I., ETC.)

The Editor cannot accept responsibility for any errors which may appear in the Financial News Section.

BANK RATE

1931. May 14	2½ per cent.
,, July 23	3½ ,,
,, July 30	4½ ,,
,, September 21	6 ,,

The recovery in the price of sugar is reflected in the final accounts of **Tate and Lyle, Ltd.**, covering the financial year to September 30 last, the working profit amounting to no less than £905,372, after charging income tax, as compared with £213,040 in 1929-1930, while after crediting other income, and charging fees and debenture interest, the net profit worked out at the substantial figure of £901,482, compared with £339,584 shown in the previous account. The rate of ordinary dividend has consequently been raised from 10 per cent. to 13½ per cent., and after transferring the sum of £350,000 to reserves, an increased amount is carried forward. Registered in 1903, the company controls **Fairrie and Co., Ltd.**, the authorised share capital being £4,500,000, all of which has been issued and paid up, comprising £1,100,000 in the form of 6½ per cent. cumulative preference £1 shares, and £3,400,000 in ordinary £1 shares. The following is a summary of the 1930-1931 appropriation figures:

	£
Brought forward from 1929-1930 ...	40,850
Net Profit—year ended September 30, 1931	901,482
Disposable Balance	£942,332
6½% Dividend on £1,100,000 Cumulative Preference £1 Shares	71,500
13½% Dividend on £3,400,000 Ordinary £1 Shares	459,000
Transferred to Depreciation Reserve	100,000
Transferred to Dividend Reserve	80,000
Transferred to Investment Reserve	70,000
Transferred to General Reserve	100,000
Carried forward to 1931-1932	61,832
	£942,332

The principal balance sheet items are enumerated below:

	Sept. 30, 1931. £
Stocks and Stores	1,465,829
Debtors	1,215,254
Cash	519,976
Creditors	665,152
Fixed Assets	5,630,238
Investments in Subsidiary and Associated Companies	611,062
4½% 1st Debenture Stock	500,000
5½% Debenture Stock	1,250,000

At the recent price of 90, the first debenture stock yields 5 per cent., while the 5½ per cent. stock stands at par. The preference shares were recently quoted at 23s. 6d., and the ordinary shares at 40s.

Satisfactory results are reported by the **Aerated Bread Co., Ltd.**, the trading profit and other income for the financial year ended September 30 last having increased to £198,075. After debiting income tax, depreciation, and directors' fees, the balance of net profit was £104,665, as compared with £79,328 in 1929-1930, enabling the ordinary dividend to be maintained at the rate of 5 per cent., and a much higher figure to be carried forward. This company was registered in 1862, and owns all the shares of **Bertram and Co., Ltd.**, and practically all the ordinary shares of **James Cottle, Ltd.**, and of **J.P. Restaurants, Ltd.**, also a substantial proportion of the ordinary shares of **W. Hill and Son., Ltd.**, as well as all the shares of **Abford Estates, Ltd.** The authorised share capital is £1,750,000, all of which has been issued and paid up in £1 shares comprising £500,000 in 6½ per cent. cumulative preference, and £1,250,000 in ordinary shares. Details of the 1930-1931 appropriation account are given below:

	£
Brought forward from 1929-1930 ...	20,846
Net Profit—year ended September 30, 1931	104,665
Disposable Balance	£125,511
6½% Dividend on £500,000 Cumulative Preference £1 Shares	25,187
5% Dividend on £1,250,000 Ordinary £1 Shares	46,875
Carried forward to 1931-1932	53,449
	£125,511

The chief assets and liabilities are:

	Sept. 30, 1931. £
Properties	1,054,918
Plant	484,076
Shares in Subsidiary and Associated Companies, less reserve	330,784
Stocks	53,601
Debtors	105,568
Cash	38,615
Creditors	223,548

The preference shares were recently marked at 21s. 9d., and the ordinary shares at 19s. 3d.

The net profit of £135,985 realised by **Foster Clark, Ltd.**, during the twelve months ended September 25 last, was arrived at before allocating £21,500 to tax reserve, and before reducing the book value of investments by £50,000, consequently the rate of ordinary dividend has been reduced from 30 per cent. to 22½ per cent., and a slightly less amount carried forward to the next account. Registered as a private concern in 1920, and converted into a public company in June, 1928, the entire authorised share capital of £450,000 has been issued and paid up in the form of £100,000 7½ per cent. cumulative preference shares of £1 each, and £350,000 in ordinary shares of 10s. denomination. The final figures relating to the past financial year are summarised below:

	£
Brought forward from 1929-1930 ...	65,126
Net Profit—year ended September 25, 1931	135,985
Transferred from Dividend Equalisation Reserve	20,000
Disposable Balance	£221,111
7½% Dividend on £100,000 Cumulative Preference £1 Shares	7,500
22½% Dividend on £350,000 Ordinary 10s. Shares	78,750
Written off Investments	50,000
Transferred to Tax Reserve	21,500
Carried forward to 1931-1932	63,361
	£221,111

The main balance sheet items are the following :

	Sept. 25, 1931.
	£
Freeholds	73,280
Plant	30,704
Investment in Australian Subsidiary	58,808
Owing by Australian Subsidiary	11,270
Debtors	25,214
Stocks	93,035
Cash	63,521
Creditors	63,523
Pensions Fund	46,372
Employees' Deposits, less loans	23,881
Tax Reserve	45,331
Investment Reserve	110,000
Dividend Equalisation Reserve	60,000
General Reserve	54,352

The ordinary shares were recently quoted at 30s. 9d.

The margin of net profit realised by **Press Caps, Ltd.,** during the year to June 30 last was £1,017, as compared with a loss of £1,460 sustained during the preceding financial period. After adding the sum of £676 brought in from the 1929-1930 account, there was an available balance of £1,693, enabling £1,000 to be transferred to reserve, and one-half year's dividend on the preference shares to be paid to December 31, 1930, the balance being carried forward to the next account. This company was registered in 1922 for the purpose of acquiring and exploiting British patent rights of " Upressit " metal cap, which is an air-tight closure for sealing bottles, jars, tins, and other containers. The authorised share capital is £85,000 in shares of 5s. each, of which a total of £69,308 has been issued and paid up, consisting of £4,308 in the form of 10 per cent. cumulative participating preference shares, and £65,000 in ordinary shares. The following is a summary of the 1930-1931 appropriation figures :

	£
Brought forward from 1929-1930	676
Net Profit—year ended June 30, 1931	1,017
Disposable Balance	£1,693
½-year's Dividend on Preference Shares to December 31, 1930	226
Transferred to Reserve	1,000
Carried forward to 1931-1932	467
	£1,693

No dividend has been paid on the ordinary share capital since 1928, when 2½ per cent. was distributed.

At May 31, 1930, the profit and loss account of **Genval, Ltd.,** showed a debit balance of £16,371, and this has been further increased by reason of a net loss of £7,212 for the twelve months ended May 31 last. Registered in February, 1929, the company acquired freehold property at Genval-les-Eaux, near Brussels, including three natural mineral water springs, bottling works, pump-room, and restaurant, and has the exclusive right to exploit Genval waters throughout the world. Of an authorised share capital of £150,000, a total of £88,823 has been issued and paid up, of which £15,000 was allotted fully paid to the vendors as part purchase consideration, the balance being issued at par in March, 1929. A debit balance of £22,038 goes forward to the next account.

Losses on exchange and the world-wide depression of trade caused a sharp decline in the balance of profit realised by **Harrods (Buenos Aires), Ltd.,** during the twelve months ended August 31 last, the net amount working out at only £72,308, as compared with £470,329 shown in the 1929-1930 account. After transferring the sum of £128,348 from reserves, the available balance was sufficient to meet the interest on the funding certificates and a full year's dividend on the preference shares, the carry forward remaining unaltered. Registered in 1913, this company has an authorised share capital of £5,458,000, of which £5,373,439 has been issued and paid up, comprising £2,350,000 in the form of 8 per cent. cumulative preference £1 shares; £3,011,439 in ordinary shares of 15s. each; and £12,000 in deferred shares of 1s. denomination. The 1930-1931 appropriation figures are given below :

	£
Brought forward from 1929-1930	122,592
Net Profit—year ended August 31, 1931	72,308
Transferred from Exchange Reserve	70,000
Transferred from other Reserves	58,348
Disposable Balance	£323,248
5% Interest on £253,163 Funding Certificates	12,656
8% Dividend on £2,350,000 Cumulative Preference £1 Shares	188,000
Carried forward to 1931-1932	122,592
	£323,248

The preference shares were recently quoted at 16s. 9d., the ordinary at 7s. 3d., and the deferred at 25s.

In striking contrast to the majority of hotel companies, **Strand Hotel, Ltd.,** report an increase in profit, the gross amount being £130,541 for the financial year ended September 30 last, as compared with £124,850 during the preceding twelve months, the cost of debenture service being unchanged at £11,360, so that the net profit worked out at £119,181, enabling the dividend on the participating preferred ordinary shares to be raised from 13 per cent. to 14 per cent. The final appropriation figures are summarised below :

	£
Brought forward from 1929-1930	22,395
Net Profit—year ended September 30, 1931	119,181
Disposable Balance	£141,576
7% Dividend on £300,000 Cumulative Preference £1 Shares	21,000
8% Dividend on £200,000 Cumulative Preference £1 Shares	16,000
14% Dividend on £230,000 Participating Preferred Ordinary £1 Shares	32,200
Dividend on Deferred Ordinary £1 Shares	32,200
Transferred to Reserve	30,000
Carried forward to 1931-1932	10,176
	£141,576

Recently the 7 per cent. preference shares were quoted at 24s., the 8 per cent. preference shares at 26s. 3d., and the preferred shares at 63s. The £5,000 deferred ordinary shares are not marked.

The audited accounts of **W. H. Chaplin and Co., Ltd.,** wine and spirit traders, covering the financial year to March 31 last, disclose a comparatively small decline in profits, the amount being £31,495 as compared with £34,422 shown in the previous profit and loss account. After adding the sum of £9,017 brought forward from 1929-1930, there was a disposable balance of £40,512, enabling the ordinary dividend to be maintained at the rate of 7 per cent. for the sixth successive year, and the sum of £7,500 to be transferred to reserve. Registered in 1898, the company has an authorised capital of £350,000, all of which has been issued and paid up, consisting of £100,000 in 5 per cent. cumulative preference £1 shares, and £250,000 in ordinary £1 shares. The results for the past year are summarised below :

	£
Brought forward from 1929-1930	9,017
Profit—year ended March 31, 1931	31,495
Disposable Balance	£40,512
5% dividend on £100,000 Cumulative Preference £1 Shares	5,000
7% dividend on £250,000 Ordinary £1 Shares	17,500
Transferred to Reserve	7,500
Allocated to Directors and Staff	2,448
Carried forward to 1931-1932	8,064
	£40,512

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

516,198. **A circular label device illustrating a bag bearing the letters P.D.I., and a scroll bearing the word "Practic."** Substances used as food or as ingredients in food, but not including canned fruits or canned vegetables, and not including any goods of a like kind to canned fruits or canned vegetables. AKTIEBOLAGET PRACTIC COMP., LTD., Practicfabriken, Rydsgard, Villie, Skane, Sweden. December 2.

B520,060. **A scroll bearing the words "Blue Riband Brand." Pears, peaches, plums, nectarines, and grapes, all being fresh fruits.** CAPE ORCHARD CO., LTD., Orchard Cape Province, Union of South Africa. December 2.

PYMEX.—521,112. **Flour and mixtures for making pastry and cakes.** THRIFT STORES, LTD., Corner House, 60, Whitehall Road, Leeds. December 2. (By Consent.)

SONETT.—524,807. **Substances used as food or as ingredients in food, but not including salt and tea, and not including any goods of a like kind to any of these excluded goods.** SONETT PRODUCTS, LTD., 5, Greek Street, Leeds. December 2.

HAPPY FAMILY.—525,614. **Sweetmeats.** JOHN HORN (STOCKPORT), LTD., Bon-Bon Works, Canada Street, Stockport. December 2.

SEAKRISPS.—526,054. **Biscuits flavoured with fish.** L. NOEL AND SONS, LTD., Soho Works, Clink Street, London, S.E. 1. December 2.

BREKO.—526,774. **Cereal foods.** SAMUEL FRAINE TONKS, trading as S. F. Tonks, 63, Russell Street, Reading. December 2.

DREADNOUGHT.—526,924. **Baking powder.** The firm trading as JOSEPH LINGFORD AND SON, 5, Durham Street, Bishop Auckland, Durham. December 2.

PEP.—519,427. **Cereal foods for human use.** KELLOGG COMPANY OF GREAT BRITAIN, LTD., 329, High Holborn, London, W.C. 1. November 25.

PEAK HI.—524,361. **Dried and evaporated raisins, sultanas, currants, apricots, peaches, pears, nectarines, and prunes.** BERRI CO-OPERATIVE PACKING UNION, LTD., Berri, River Murray, South Australia. November 25.

FORTAK.—525,353. **Cocoa, chocolate, and confectionery, and a powder containing cocoa or chocolate for use in the preparation of a beverage.** ROWNTREE AND CO., LTD., The Cocoa Works, Wigginton Road, York. November 25. (By Consent.)

OMOLO.—525,695. **Fresh eggs and butter.** ASSOCIATED BUTTER FACTORIES PROPRIETARY, LTD., 491, Flinders Lane, Melbourne, State of Victoria, Australia. November 25.

JENNIFER.—525,902. **Substances used as food or as ingredients in food, but not including fish, and not including any goods of a like kind to fish.** GERTRUDE HALL, trading as Jennifer, 9, Grove Mansions, North Side, Clapham Common, London, S.W. 4. November 25.

TY-OKA.—526,462. **Substances used as food or as ingredients in food.** DAVID JONES AND CO., LTD., 33, Redcross Street, Liverpool. November 25.

BAL-KARI.—526,597. **Tea.** HAROLD HINDLE, trading as J. Milton Hindle and Son, 145, Birley Street, Blackburn. November 25.

ALLIES.—522,444. **Canned fish.** THE INTERNATIONAL CANNING CO. AKTIESELSKAB, 20, Stenkargaten, Stavanger, Norway. November 18.

Mr. PICKWICK'S.—522,664. **Chocolate.** JAMES MARSHALL, Northumbria Works, Maddison Street, Blyth, Northumberland. November 18. (By Consent.)

CAMELS BRAND.—525,753. **Substances used as food or as ingredients in food.** PEEK BROS. AND WINCH, LTD., 20, Eastcheap, London, E.C. 3. November 18. (Associated.)

SUNVILENE.—526,294. **Substances for use in food or as ingredients in food.** EDWARD SUTCLIFFE, LTD., Station Road, Mirfield, Yorkshire. November 18. (Associated.)

"SUN ROLE."—523,250. **Bread.** A. B. HEMMINGS, LTD., trading also as "Shingles," 200, Fulham Road, London, S.W. 10. November 11. (By Consent.)

FRUTONA.—525,023. **Canned fruits.** WILLIAM JOHN JONES, trading as Utona Products, 30, High Bridge, Newcastle-on-Tyne. November 11. (By Consent.)

GIRLIE.—526,101. **Dried, condensed, and sterilised milk for food, cream, and tinned butter.** AKTIESELSKABET DEN DANSKE MAELKEKONDENSERINGSFABRIK, Vejlebrogade, Namskov, Denmark. November 11.

PELROSE.—525,286. **Jams and marmalade.** EDWARD PAUL, 114, Camberwell New Road, London, S.E. 5. November 11.

FLOODLIGHT.—526,251. **Sugar confectionery and chocolates.** G. F. LOVELL AND CO., LTD., The "Mon" Confectionery Works, Albany Street, Grindau, Newport, Monmouthshire. November 11.

BONACCORD.—526,265. **Fish and foods prepared from fish.** A. AND M. SMITH, LTD., Albert Fish Curing Factory, Albert Quay, Aberdeen. November 11. (Associated.)

Recent Patents (*continued from next page*).

acid. The residue is treated with the same solvent for twenty-four hours, and the combined extracts, after filtration, are distilled under reduced pressure. The viscous residue is dissolved in glacial acetic acid, anhydrous acetone is added, and the granular precipitate which forms is separated and washed with acetone. The washings and solution are combined, and the acetone and most of the acetic acid successively distilled off at reduced pressure. The acetic acid remaining in the viscous residue may be neutralised with alkali, but preferably distilled water is added, and the resulting liquid, spread in a thin film, is allowed to evaporate under ordinary conditions, with the aid of a current of air if desired. Alternatively, the residue remaining after distilling off the acetone and most of the acetic acid is diluted with water, and the vitamin content thereof selectively adsorbed with suitable adsorbents such as active carbon or silica gel, after adjusting the hydrogen-ion concentration of the liquid with the aid of acids, alkalis, or buffer salts to a predetermined optimum value. When the starting material is rice polishings and active carbon is used as the adsorbent, a *p*H value of 4 to 5 is suitable. The vitamins are subsequently set free from the active carbon by washing twice with decinormal hydrochloric acid, followed by two extractions with aqueous ethyl alcohol. The acid washings and alcohol extracts are distilled under reduced pressure, leaving the vitamin concentrate as a gummy residue. Prior to setting free the vitamins from the active carbon, the latter may be washed with 90 to 95 per cent. ethyl alcohol, the washings added to the liquid residue of the adsorption treatment, and any unadsorbed vitamin suitable recovered from the combined liquids.

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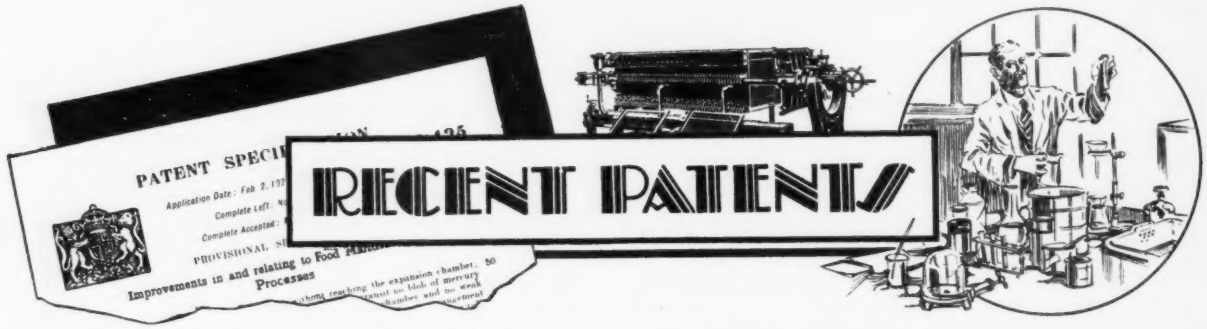

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Latest Patent Applications

32215. BELFORD, J.: Rye foods, and production thereof. November 20.

31859. PHILLIPS, C. L. E. O. H. T.: Cream-making machines. November 17.

31951. SCOUGAL, D.: Making cakes. November 18.

31025. ÆSCHBACH AKT.-GES., F.: Meat-chopping machines. November 9.

31287. BAKER, G. R., and BAKER PERKINS, LTD.: Feeding biscuit shapes, etc., to ovens, etc. November 11.

Specifications Published

361,769. NAAMLOOZE VENNOOTSCHAP MAATSTHAPPIJ TOT VERVAARDIGING VAN SNIHMACHINES VOLGENS VAN BERKEL'S PATENT EN VAN BERKEL W. A. VAN: Slicing machines.

361,026. FEENY, C. J. (VITAMIN FOOD CO., INC.): Process for the manufacture of yeast producing high yields.

361,032. MACQUEEN, J.: Machine for forming butter into pats or blocks.

361,138. GENERAL FOODS CORPORATION: Gelatine food preparations.

361,201. KROYER, M. C.: Mincing machines.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts Published

Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued, on payment of a subscription of 5s. per group volume, or in bound volumes price 2s. each.

347,244. **Cheese.** AXELROD, A., 45, Hadlaubstrasse, Zurich, Switzerland.

Cheese is made by fermenting milk, which has preferably been pasteurised and cooled, with lactic acid producing bacteria together with peptonising bacteria in the presence of compounds adapted to neutralise the lactic acid formed, thickening the mixture, treating with acid and rennet in the known manner, moulding and ripening. Suitable lactic acid producing bacteria are *Bacillus bulgaricus* and kephir yeast, and a suitable peptonising bacterium is *Micrococcus casie liquefaciens. Bacillus caucasicus* when used in conjunction with *Micrococcus casie liquefaciens,* also serves as a lactic acid producing bacterium. Suitable neutralising compounds are alkaline sodium phosphate, soda, and calcium oxide. The thickening may be effected in a partial vacuum, the mixture being reduced to about one-third or one-quarter of its volume. Specification 148,724 (Class 84, Milking, etc.) is referred to.

According to the specification as open to inspection under Sect. 91 (3) (a) the whey separated from milk, which has been treated with rennet and soured by known methods, is fermented as described above, thickens to about one-eighth its volume, and added to crustless or other cheese. The subject matter does not appear in the Specification as accepted.

355,432. **Moulding butter by stationary-mould machines.** POLLOK, J. C., 14, Muir Street, Hamilton, Lanarkshire, and MCERLANE, D. A., 9, Carbrool Street, Gardgad, Glasgow.

In a butter-print moulding machine of the type in which a die co-operates with a matrix having an ejecting planger, the die is adapted to be swung manually about a vertical axis against the action of a spring into the operative position, retained by a latch, and then released from said latch by a retrograde movement of the die so as to be swung clear of the matrix by the spring. The die is detachably secured to a carrier engaging vertical guides and entrained by a slide connection to the hand lever. The carrier is restrained in the operative position by the latch, which is tripped by the striker on its upward movement. The ejector is carried by a rod having a cross-head engaging the guides, and restrained in its lower position by a spring. On upward movement of the die the shoulder on the arm is brought into contact with the projection and raises the ejector. After further movement, the tappet strikes the bracket and trips the lever, which allows the ejector to fall again. The upward movement of the hand lever is assisted by the spring. The Provisional Specification described an ejector which is urged towards the ejecting position by a spring and is restrained by a trigger which is released automatically when the carrier reaches its highest position.

355,501. **Drying and cutting macaroni, etc.** UHL, J. (trading as UHL'S SOHNE, J.), 17, Schagunag, Sibiu, Hermannstadt, Roumania.

Pieces of dough—*e.g.*, macaroni— are hung on pegs on a rake and are trailed by the rake over a board and deposited thereon in parallel rows, the board then being traversed to carry the projecting ends of the dough pieces past rotary cutters, which cut the pieces to uniform length. The board then carries the dough to a drying apparatus. The rakes drop into hooks having stub spindles, which seat in recesses on a pair of discs and remain stationary during the loading operation. Chains carry a cross-bar, which, on movement of the chains, acts on arms to turn the discs, thereby carrying the rake to a position where the hooks are caught by a second cross-bar on the chain. The rake then trails the dough pieces till the hooks are tilted by a fixed stop, thereby releasing the dough pieces from the rake. When the hook reaches arms it is caught by a cross-bar carried by the arms, the arms being rotated by the bar co-acting with springs. The hooks are thus deposited in the recesses and are released from the bar by cams operating on lugs on the hooks.

354,421. **Vitamins.** SURE, B., 31, South Hill Street, Fayetteville, Arkansas, U.S.A.

Water-soluble vitamins, particularly vitamins B and G, are obtained by subjecting suitable parent materials—such as rice polishings, wheat embryo, or yeast—to an extracting action, and treating the extract with a glacial acetic acid and acetone to produce a concentrate by precipitating admixed impurities. In an example, rice polishings are treated for forty-eight hours with agitation with aqueous ethyl alcohol acidulated with acetic

(*Continued on previous page.*)